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Period covered: 1 April–15 May
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Crop monitoring in Europe
May 2016

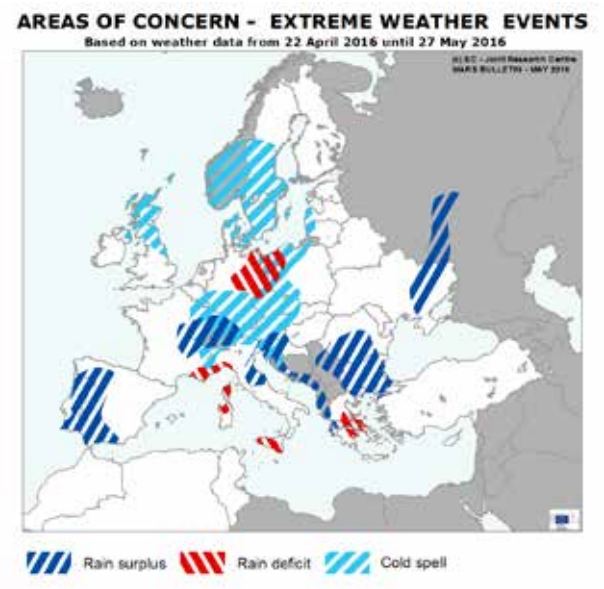
Fairly good outlook despite unsettled weather

Cold spell at the end of April but damages are limited

In general, the current prospects for EU-28 yields are above the five-year average, and the forecast for total cereals has increased compared to our last Bulletin, reflecting the generally fair growth conditions. Some delays for summer crop sowings due to cold and wet periods, except south-eastern Europe.

The first two dekads of April were exceptionally warm in south-eastern, eastern and part of central Europe. Maximum daily temperatures reached 25 °C to 30 °C, and even exceeded 30 °C in several regions of the South-East. A cold spell at the end of April affected many regions of central Europe, parts of western Europe and the north-western Balkans. Sparse rainfall was recorded in north-eastern Germany, north-western Poland, southern France, southern Greece and Sicily. Rainfall surplus was recorded for the western half of the Iberian Peninsula, the Alpine area, south-eastern Europe, eastern Ukraine and central European Russia.

Compared to our previous forecasts, which were based on trends and averages, forecasts for winter crops are now produced using the results of the crop model simulations.



Crop	Yield t/ha				
	Avg 5yrs	April Bulletin	MARS 2016 forecasts	% Diff 16/5yrs	% Diff April
TOTAL CEREALS	5.32	**5.49**	5.54	+4.2	+0.9
Total Wheat	5.60	**5.85**	5.85	+4.5	+0.0
soft wheat	5.83	**6.11**	6.11	+4.8	+0.0
durum wheat	3.33	**3.38**	3.45	+3.8	+2.1
Total Barley	4.72	**4.94**	4.99	+5.7	+1.0
spring barley	4.13	**4.17**	4.24	+2.8	+1.7
winter barley	5.58	**5.97**	5.98	+7.3	+0.2
Grain maize	6.91	**7.06**	7.31	+5.8	+3.5
Rye	3.76	**3.90**	3.85	+2.6	-1.3
Triticale	4.20	**4.30**	4.26	+1.4	-0.9
Rape and turnip rape	3.21	**3.35**	3.29	+2.6	-1.8
Potato	32.09	**32.96**	33.21	+3.5	+0.8
Sugar beet	71.79	**73.49**	73.39	+2.2	-0.1
Sunflower	1.91	**1.95**	2.01	+5.0	+3.1

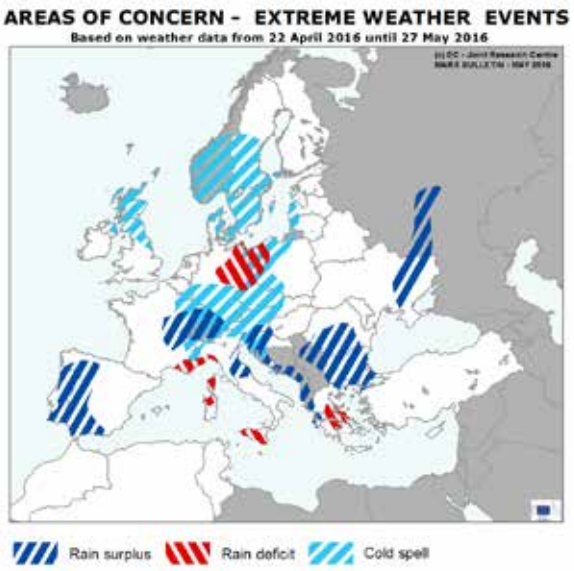
Issued: 20 May 2016

Joint Research Centre

1. Agro-meteorological overview

1.1. Areas of concern

The above maps consider the main weather events, and their impact, between 22 April and 20 May. For the weather events analysis, the ECMWF weather forecast, up to 27 May, was considered as well.
During the period under review, the rain deficit in north-eastern Germany and northern Poland, indicated in last month's Bulletin, persisted and expanded to the south. Nevertheless, precipitation was sufficient to maintain crop canopy growth, thanks to the reduced water demand determined by the cool temperatures. In central Europe (central Germany, the Czech Republic, Slovakia, Austria, Slovenia) a cold spell occurred at the end of April, when minimum temperatures dropped below zero for several days. Some snowfall occurred in southern Austria which hampered rapeseed flowering. Unusually low temperatures were also registered in the Baltic region, in southern Scandinavia, in Scotland, in eastern France and in western Germany. In eastern France, the western Iberian Peninsula, the east coast of the Adriatic Sea, in Bulgaria and in Romania a surplus of rain was registered and more rain is forecast for the coming week. In these regions winter crops benefited from the rains but delayed summer crops sowing. However, the optimal sowing window is not closed yet. A rain deficit in southern Italy locally affected the grain filling stage of durum wheat. In Ukraine, after a dry beginning of spring, the abundant precipitation of the last month allowed an optimal development of both winter and spring crops.



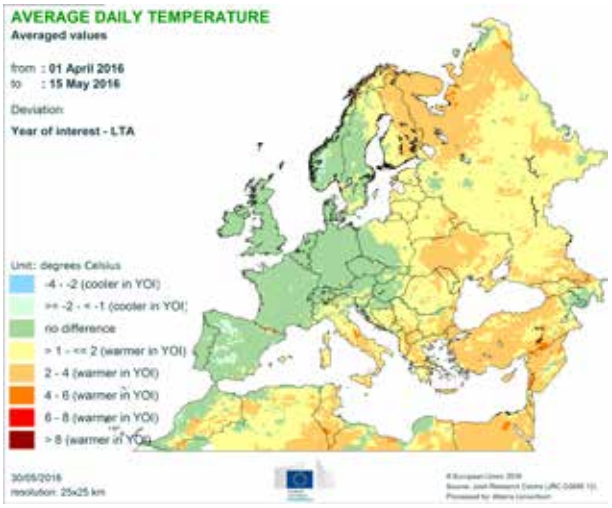
1.2. Meteorological review (1 April-15 May)

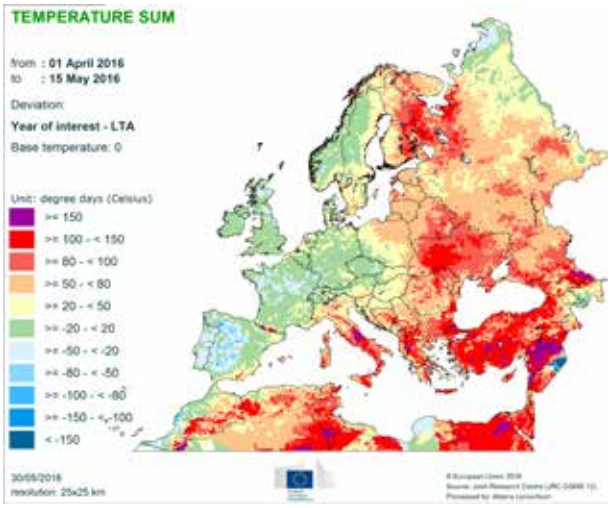
The first two dekads of April were exceptionally warm in south-eastern, eastern and part of central Europe. Temperatures were 2 °C to 6 °C above the long-term average. Maximum daily temperatures reached 25 °C to 30 °C, and even exceeded 30 °C in several regions of the south-east. In north-western and western Europe, normal temperature conditions were observed.

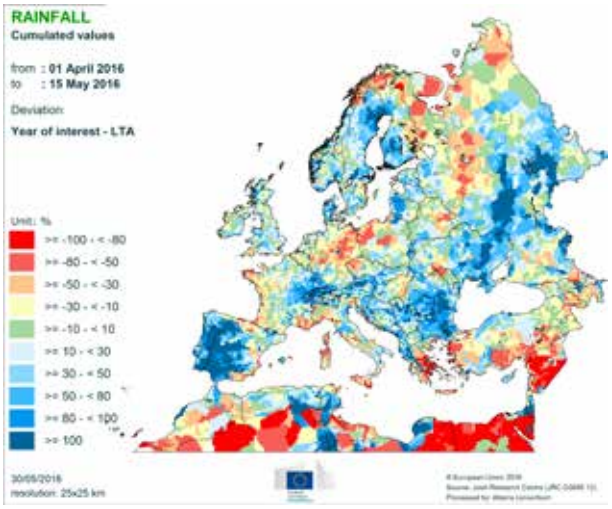
A cold spell at the end of April affected many regions of central Europe, parts of western Europe and the north-western Balkans, with air temperatures dropping by 2 °C to 8 °C below the long-term average. Minimum daily temperatures fell below 0 °C; in addition, a snow layer was recorded in many areas. Temperatures returned to normal during the first half of May (for more detail see next chapter).

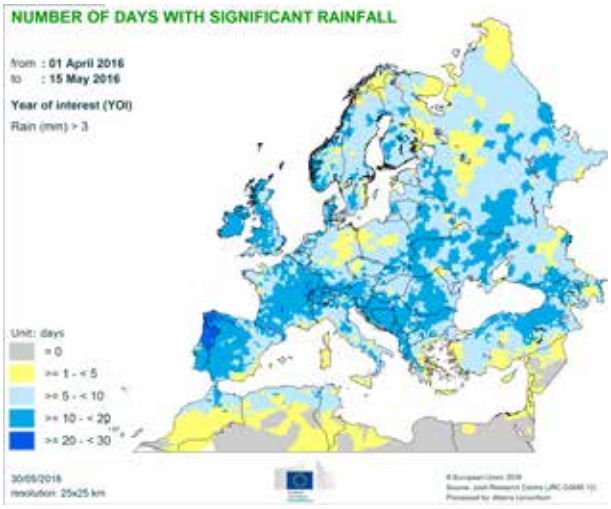
Less than 30 mm of rainfall was recorded in north-eastern Germany, north-western Poland, south-eastern Spain, northern Moldova, southern Greece and southern Turkey. The rainfall deficit in these regions has generally been observed since the beginning of the winter, and is therefore leading to soil-moisture deficits.

Rainfall surplus was recorded for the western half of the Iberian Peninsula, the Alpine area, south-eastern Europe, eastern Ukraine and central European Russia. Rainfall cumulates in these areas generally exceeded 100 to 150 mm. The rainfall surplus in these regions is delaying the sowing of summer crops.









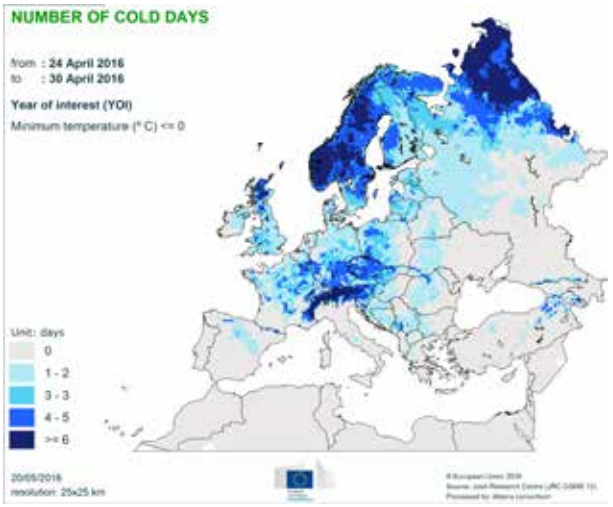
1.3. Cold spell at the end of April

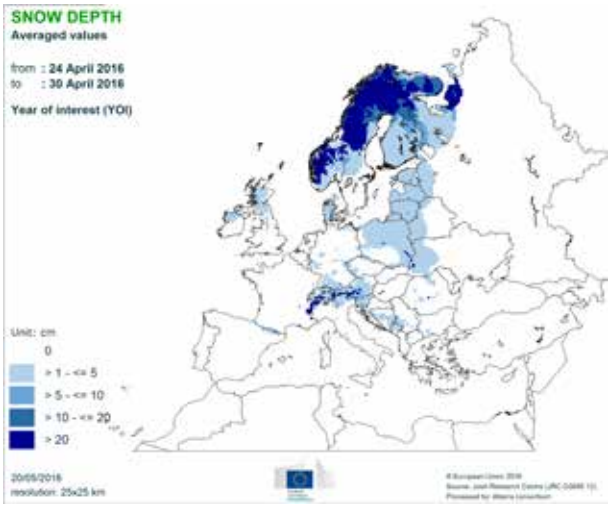
An inflow of cold air over central and western Europe caused a sudden drop in air temperatures during the third dekad of April. The polar air reached central Europe and the Alps on 24 April, leading minimum air temperatures to drop below 0 °C in many regions of Germany and north-eastern France. On 25 April, the cold air mass with negative temperatures arrived in Austria and affected major parts of the Czech Republic, Poland and the Baltic countries. The following day (26 April) was characterised by negative temperatures in Austria, Poland, Slovakia, the western half of Hungary, Slovenia, Croatia and locally in the central Balkan regions. On 27 April, a new cold front reached the Alps, while the upper air trough moved towards central Europe. These atmospheric conditions generated heavy rains in southern Austria and northern Slovenia, with snowfall also occurring in the valleys. Negative temperatures persisted in central and eastern France, southern Germany, the Czech Republic, Slovakia, Austria, Slovenia and the westernmost areas of Hungary on 28 and 29 April. Temperatures returned to the climatological norm during the first dekad of May.

The most affected areas were southern Germany, the Czech Republic, Poland, Austria, the western half of Slovakia and Slovenia, where temperatures were 6 °C below the average, and minimum temperatures fell to – 3 °C. However, based on the geomorphology and micro climatic conditions, temperatures directly above ground are often lower than those measured at a height of 2 m. The longest period with minimum daily temperatures below 0 °C was recorded for Austria (especially *Kärnten* and *Steiermark*), large areas in the Czech Republic, and south-eastern Germany. Snowfall was recorded in many areas affected by the cold spell. The heaviest snowfall was recorded in major parts of southern Austria and Slovenia (except the north-eastern part) and, to a lesser extent, in southern Germany, the western part of the Czech Republic and Croatia. The greatest snow depth over agricultural areas may locally have reached 20 cm. Air temperatures returned to normal during the first half of May.

The cold spell affected crop growth and development, especially in Austria, Slovenia, Croatia, western Slovakia and, to a lesser extent, in western Hungary, southern Germany, the Czech Republic, Poland and east-central France (see also country analysis and sowing conditions).

- The cold spell greatly impacted orchards and vineyards, particularly in the valleys of the Alps.
- Arable crops were impacted more locally, depending on their respective development stage.
- Potatoes, grain maize and sunflowers were at the emergence stage due to early sowings in Austria, the Czech Republic, Slovakia, Slovenia and Croatia (on average 14 days earlier than usual). As tolerance to frost after emergence is very low, these crops may have suffered from the cold spell. For example, critical temperatures for grain maize at the emergence stage range from – 2 °C to – 3 °C. Presumably some fields, especially in Austria and Slovenia, will need to be resown.
- As winter rapeseed was flowering at the time of the cold spell, it was at a vulnerable stage. In addition, pollination rates are low due to low insect activity because of the cold weather.
- In areas with snow cover (mainly southern Austria, and northern and central Slovenia), heavy snowfall may have caused physical damage to winter crops by bending the stalks. This physical damage may further deteriorate the flowering of winter wheat and already partially damaged winter rapeseed.

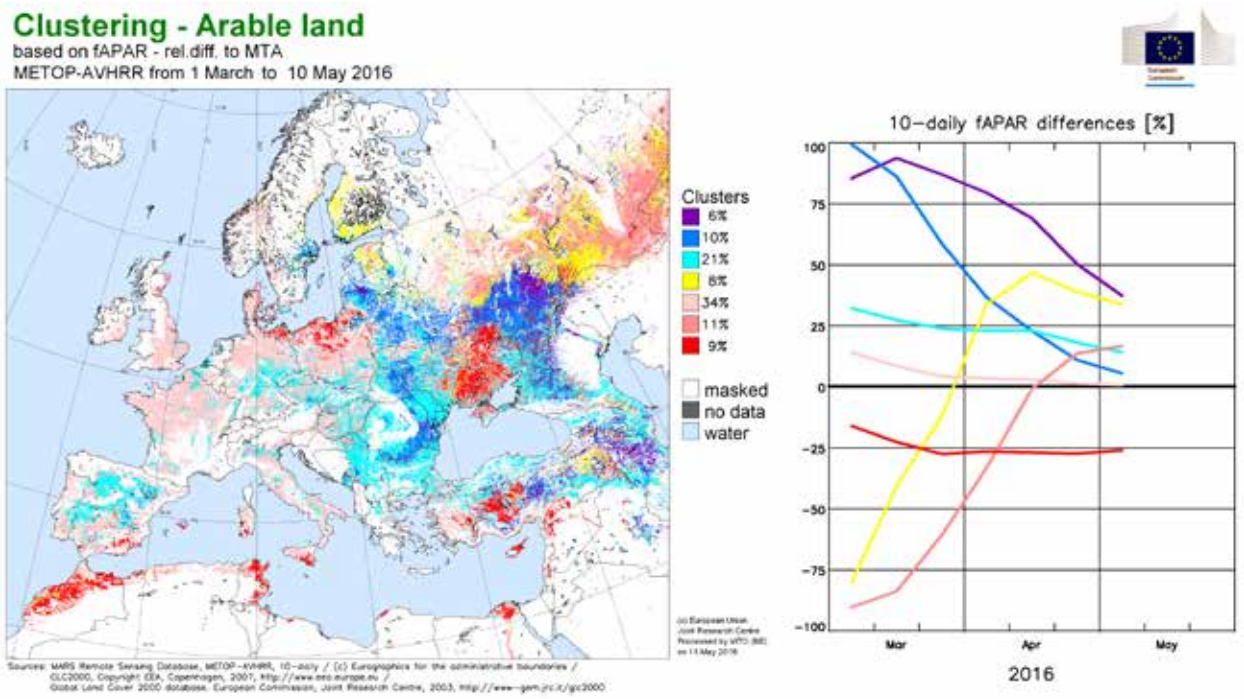


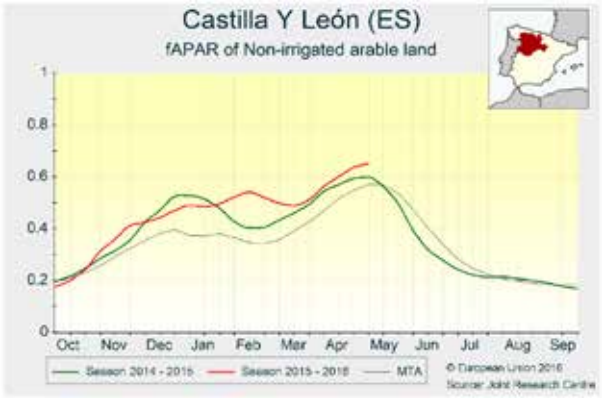


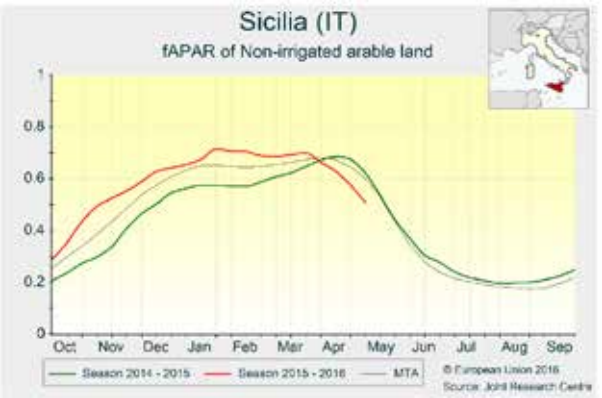
2. Remote sensing — Observed canopy conditions

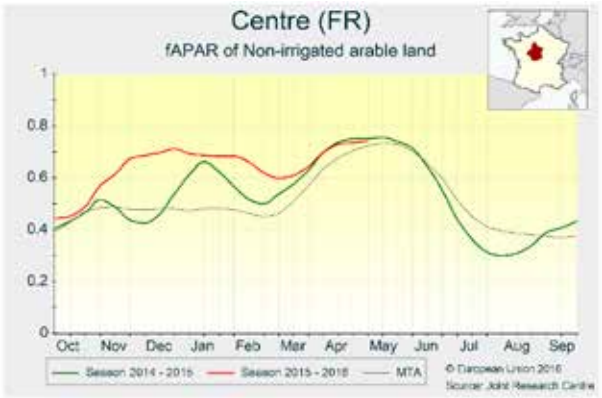
Positive biomass accumulation in Mediterranean and eastern regions

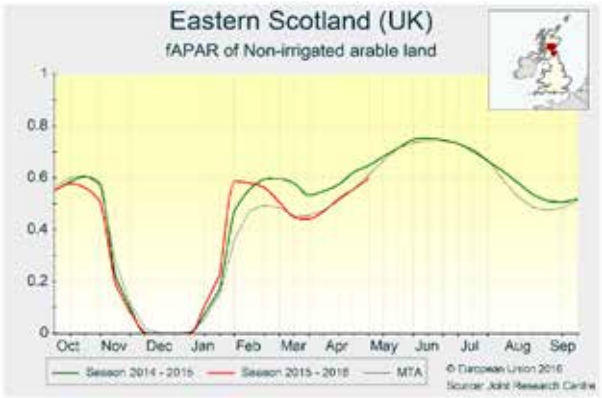
The cluster map displays the behaviour of fAPAR (fraction of Absorbed Photosynthetically Active Radiation) from 1 March to 10 May 2016, as compared to the medium-term average (MTA, 2007-2015). In **Spain** (e.g. *Castilla y León*), below-average temperatures and abundant rains delayed the sowing of summer crops and slowed the development of winter crops. Nevertheless, winter crops are entering the flowering stage, with biomass accumulation ranging from above average (**light blue** profile) to average (**pink** profile). In **France**, the growth rates of winter crops moved from advanced to normal development (**pink** profile) due to cool temperatures and a reduced radiation level (e.g. *Centre*). Similar weather and crop conditions are observed in the main agricultural regions of the **United Kingdom**, where biomass accumulation is low in Scotland due to late spring barley sowings (e.g. *eastern Scotland*). In **Italy** and **Greece**, crop canopy conditions are optimal (shown in **pink** and **light blue**) thanks to the warm temperatures and precipitation of the past weeks. Where there was no rain, advanced crop senescence has reduced yield expectations (e.g. *Sicilia*). Advanced and well developed winter crop canopies are present in central **Germany** (shown in **light blue**), while the lack of biomass accumulation in northern arable areas (*Mecklenburg-Vorpommern*) suggests a partial shift from winter to spring crops due to the unfavourable winter conditions and related damages (shown in **red**). A similar situation is found in northern **Poland** (shown in **red**), where frost kill and dry conditions affected winter crops and led to the resowing of spring crops. In the main agricultural areas of the **Czech Republic**, **Slovakia**, **Austria** and **Hungary** (e.g. *Nyugat-Dunantul*), the vegetative growth of winter crops is advanced and vigorous (**light blue**), despite being locally hampered by the low temperatures and scattered snowfall that occurred in late April. The remote sensing signal has not yet captured any impact; if relevant, this will become visible in the coming weeks. In **Romania** and **Bulgaria**, crop leaf expansion is better than average in large parts of the arable land areas (**dark blue** regions), and crop development is advanced, with winter crops almost entering the flowering stage. Winter crop development in the **Baltic countries** is mainly represented by the **yellow** profile. The development stages are advanced compared to the average, and the warm temperatures of recent days helped boost canopy development. In eastern **Ukraine**, frost kill led to the partial resowing of crops (regions in **red**). The weather conditions of April and May were favourable for the growth of winter and spring crops. In **Turkey**, the crops impacted by dry conditions in early spring benefited from the precipitation of late April and early May. In the **Maghreb** regions, drought conditions hampered the whole season, which is now at its end. The **light red** and **violet** classes indicate leaf expansion trends in eastern **Russia**: crops are in their vegetative growth stage, and are slightly advanced compared to normal development.

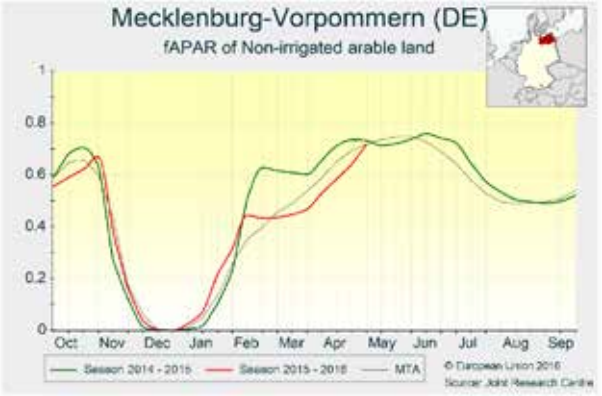


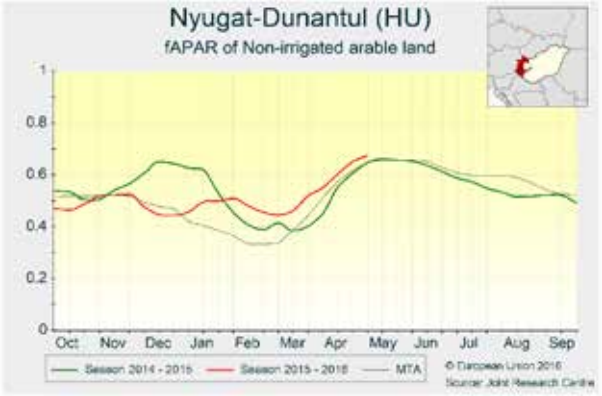

Castilla Y León (ES)
fAPAR of Non-irrigated arable land
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2014 - 2015
Season 2015 - 2016
MTA

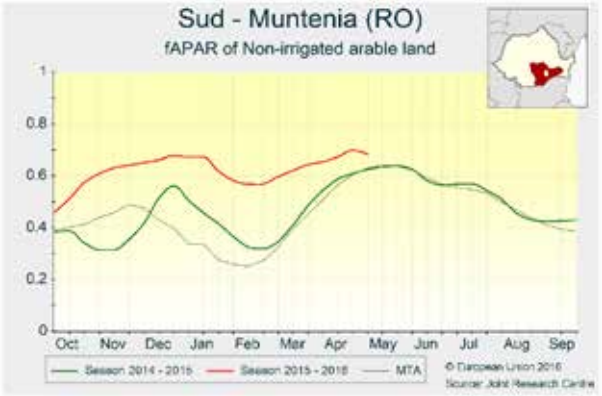

Sicilia (IT)
fAPAR of Non-irrigated arable land
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2014 - 2015
Season 2015 - 2016
MTA

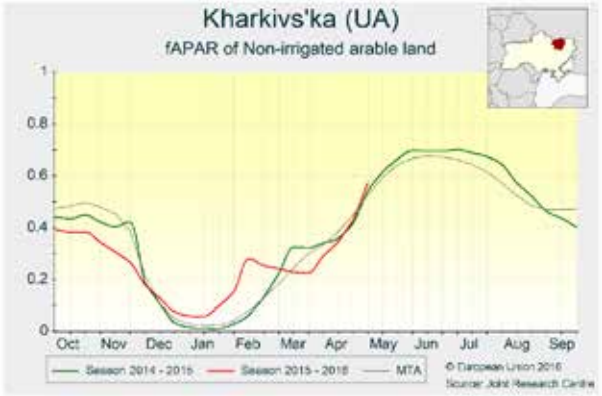

Centre (FR)
fAPAR of Non-irrigated arable land
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2014 - 2015
Season 2015 - 2016
MTA


Eastern Scotland (UK)
fAPAR of Non-irrigated arable land
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2014 - 2015
Season 2015 - 2016
MTA


Mecklenburg-Vorpommern (DE)
fAPAR of Non-irrigated arable land
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2014 - 2015
Season 2015 - 2016
MTA


Nyugat-Dunantul (HU)
fAPAR of Non-irrigated arable land
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2014 - 2015
Season 2015 - 2016
MTA


Sud - Muntenia (RO)
fAPAR of Non-irrigated arable land
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2014 - 2015
Season 2015 - 2016
MTA


Kharkivs'ka (UA)
fAPAR of Non-irrigated arable land
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2014 - 2015
Season 2015 - 2016
MTA

3. Country analysis

3.1. Sowing conditions

Spring barley

The sowing of spring barley has been completed in central and southern Europe under positive conditions, but is still underway in Denmark and the Baltic countries.

Spring barley sowing activities were completed in Spain during the first half of March. After a rather humid January, precipitation levels in February were close to the norm, and this favoured the rapid progression of sowing activities across all regions. However, temperatures from March onwards have been below average, and this has led to a slight delay in crop development. Similarly, meteorological conditions in France favoured the sowing of spring barley, which was completed by the end of March with no major delays. The crop is currently in the heading phase, with adequate vegetative growth thanks to sufficient rainfall and temperatures that are slightly above seasonal values.

The sowing of barley got underway in the second and third weeks of March in the UK and Ireland, during a period with no significant rainfall, and was completed by the end of that month. Mild temperatures in the first week of April favoured rapid crop emergence. Barley has reached the heading phase in practically all regions, and the crop status is positive. In Ukraine and western Russia, rainfall levels were slightly above the long-term average from mid-March, the period during which spring barley sowing activities get underway. However, this did not cause any important delays. Barley is now in the heading phase under satisfactory conditions in most regions, thanks to the higher-than-usual temperatures during most of April.

Sowing activities have been completed in the Czech Republic, Germany and Poland under generally favourable conditions. Spring barley has just reached the heading phase and, overall, crop conditions are positive. Substantial precipitation at the end of April caused some delays to late sowing activities in Denmark. The first two weeks of May were dry, which will help facilitate access to fields that are not yet sown. In the Baltic area, most of the sowing activities got underway in the first half of May, facilitated by favourable weather conditions, with practically no rain and temperatures above seasonal values. These conditions will lead to a reduction in soil moisture after a rather humid end of April, thereby facilitating access to fields.

Sugar beet

Sowing conditions for sugar beets were mostly adequate in central and eastern Europe. Wet weather hampered the progress of sowing in the UK, France and the Benelux countries. The cold spell of late April did not cause significant frost damages, but delayed early crop development.

In general, weather conditions were adequate for the sowing of sugar beets in most of Europe. Thanks to the near- or above-average temperatures and rain frequency, sowing activities were completed within the normal window or with only a slight delay. In the main EU sugar beet-producing regions of Germany and Poland, the progress of sowing activities was normal or even advanced compared to an average year due to scarce rainfall events. However, the sowing campaign of sugar beets was temporarily interrupted by the frequent and ample rainfall of late March and early April in France, the UK and the Benelux region. In Hungary and Romania, the wet topsoil conditions locally hampered sowing activities in the last dekad of March, but sowing conditions became more favourable during April. In Italy and Turkey, extensive dry periods supported the timely or even early completion of the sowing of sugar beets, but germination is expected to be delayed in some areas due to low soil moisture levels. Weather conditions have also allowed for the timely start of sowing activities in the Baltic countries as well as in major eastern non-EU producers, such as Belarus, Ukraine and Russia. Frost events were very mild and infrequent until 20 April. In the last dekad of April, a cold spell affected a wide area from the UK through northern France, Germany, and central Europe to Poland and the Baltic States. However, as daily minimum temperatures only fell by 3 °C, and given the early development of sugar beets, typically only slight frost damages (e.g. thinning of the crop stands) are likely to have occurred.

Sunflower

Sowing conditions for sunflowers were mixed: predominantly favourable in eastern Europe, and adverse in western Europe due to rainfall. The cool temperatures observed throughout Europe in late April and early May were unfavourable for rapid emergence.

Weather conditions were favourable in eastern Europe. In Romania and Hungary, conditions were favourable for timely sowing activities: cumulated precipitation was lower than average, and temperatures were far above average. In Bulgaria, colder-than-usual temperatures during the second half of March led sowing activities to be slightly postponed to the first dekad of April, when very good conditions were recorded, with temperatures 4 °C above average.

Western Europe had mild and humid weather during the usual sowing period, which led to some sowing activities being delayed. In Spain, March was milder than usual, while substantial rainfall in April hampered farm activities. France also experienced a rainy and colder-than-usual April. The best window without substantial rainfall and with sufficient temperatures for sowing activities was observed during the first dekad of May. In Italy, good conditions ensured timely sowing activities. All over Europe, the chilly temperatures observed during the last dekad of April and early May slowed down the emergence of sunflowers. Yields of sunflowers depend partly on how early they were sown. The delay in sowing and the below-average temperatures during emergence may impact the final yields.

Grain maize

Grain maize sowing activities present slight to considerable delays in most of Europe, and probably some areas need to be resown because of the very low temperatures that occurred during the third dekad of April. Sowing activities in the south-eastern parts of Europe were completed without problems.

All of the French crop-growing regions currently have a sowing delay because sowing activities were disrupted by frequent rainfall events during April and the low temperatures towards the end of the month. A suitable sowing window occurred during the first dekad of May, but then it started raining again. It is estimated that around 45 % of the grain maize area in France has currently been sown. In Romania, Hungary, Austria, Bulgaria, Croatia, Slovenia, the Czech Republic and Slovakia, the sowing of grain maize was completed earlier than usual or at a near-normal pace in April, which presented appropriate sowing windows between periods of rainfall. During late April, however, these countries, and particularly Austria and Slovenia, experienced very low temperatures that negatively impacted the emerging crops, and some areas probably need to be re-sown. Sowing in Germany has been slightly delayed. Sowing activities started on time (after 20 April), but were interrupted after a few days because of rainfall and low temperatures. A similar situation is reported for Poland. In the Iberian Peninsula, sowing activities were completed by the end of April and the first dekad of May. Delays are reported locally in the northern regions of Spain (e.g. León).

In Italy, the third EU maize producer after France and Romania, sowing activities started at the beginning of April and were completed with no particular problems. Maize crops have emerged and are progressing well. In Greece, sowing activities were completed around mid-April, and emerging crops benefited from rainfall in early May.

Potato

Wet weather and cold conditions during part of the campaign hampered the progress of potato sowing in the UK, France and the Benelux countries. Sowing conditions were mostly adequate in central and eastern Europe. The cold spell of late April stalled development of standing crops but without causing irreversible damage.

In the main EU potato producing regions of Germany and Poland, conditions for the progress of sowing activities were adequate and sowing could be completed within the normal window. In France, the UK and the Benelux region, however, the sowing campaign of potatoes extended well into May, with delays of one to three weeks, due to wet and cold soil conditions during large parts of April. Sowing in parts of Spain and Denmark was also hampered by wet conditions. In other parts of Europe, weather conditions were generally adequate for timely sowing of potatoes.

In the last dekad of April, a cold spell affected a wide area from the UK through northern France, Germany, and central Europe to Poland and the Baltic States. However, as frost occurrences were light, and given the early development of potatoes, negative impacts on potato stands are likely to have been relatively small and mostly reversible. These impacts and the late sowings in some of the largest potato producing countries will not necessarily lead to reduced yield levels, but it could mean that harvesting will also be shifted forward in the regions affected, depending on weather conditions during the remainder of the season.

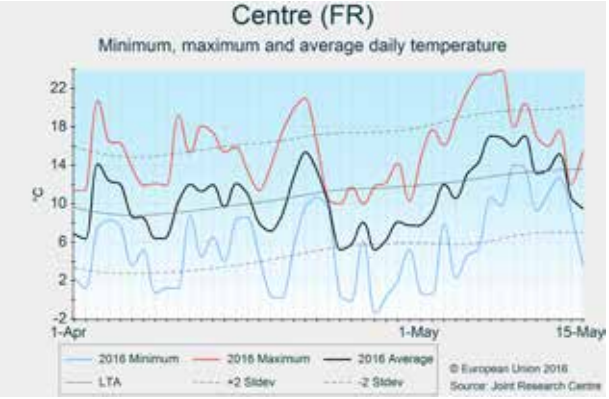
3.2. European Union

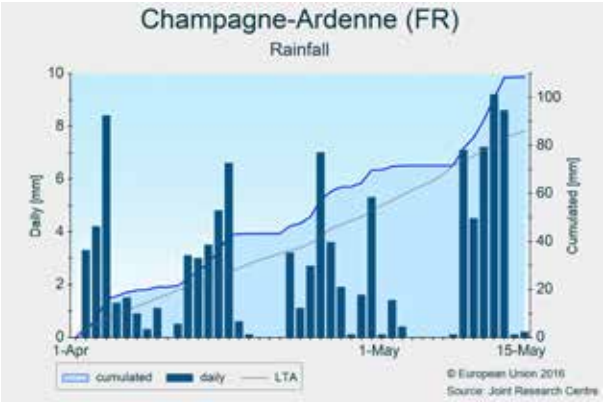
France

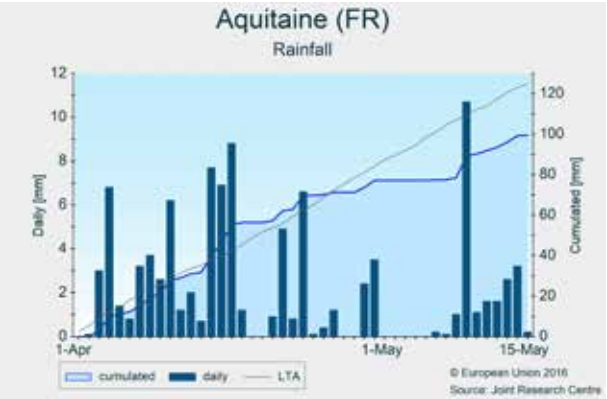
Humid and cold weather slightly lowered the positive outlook

The period of analysis was characterised by humid weather and a cold spell at the end of April. The sowing of sugar beets, grain maize, and sunflowers was delayed due to wet soil conditions. The yield outlook is positive for winter cereals, and average for other crops.

Temperatures remained close to the average until 23 April, and then dropped to well below the seasonal average until the end of the month. Minimum temperatures fell slightly below 0 °C, except in the southernmost regions. Cumulated rainfall was slightly above the average in the Massif Central and in the northern half of the country. Meanwhile, Franche-Comté received 100 mm more rainfall than average. The western regions, from Aquitaine to Bretagne, had a slight rain deficit. The number of rainy days was generally above the average for the period of analysis, except on the Atlantic coast. The persistent humid weather caused delays to the sowing of grain maize, sunflowers and sugar beets, and the coldish weather at the end of April did not favour their emergence. The development of winter cereals, which was previously advanced, slowed down due to the cold snap but has now returned to average. Winter crop conditions are good. The only concern tempering yield expectations is the increased disease pressure due to the humid weather. Yields of winter wheat, winter and spring barley, triticale and rye are forecast to be above average due to the beneficial conditions that prevailed since the beginning of the season. Rapeseed is forecast to be slightly below the average due to the cold temperatures during the flowering stage. Yields of sugar beets, potatoes, sunflowers and grain maize are forecast to be close to the five-year average due to the sowing delays and/or the poor conditions during emergence.





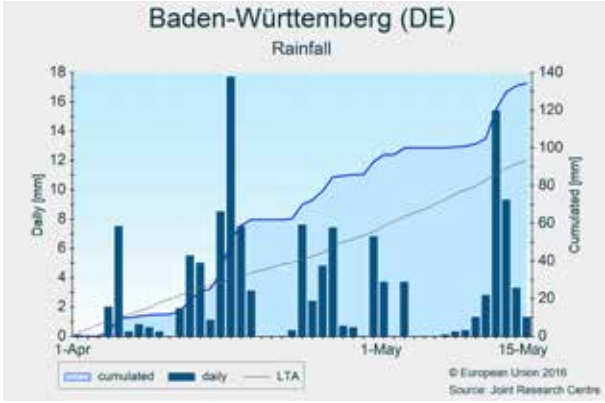


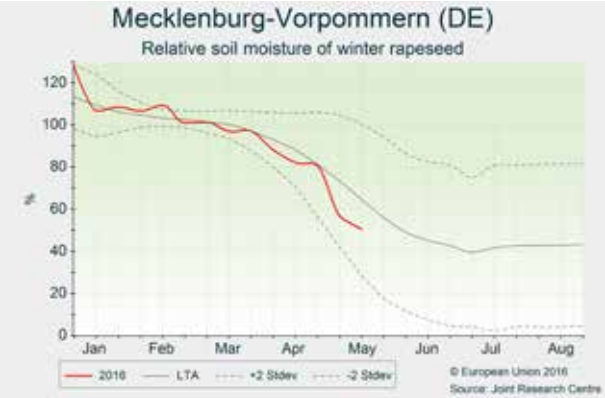
Germany

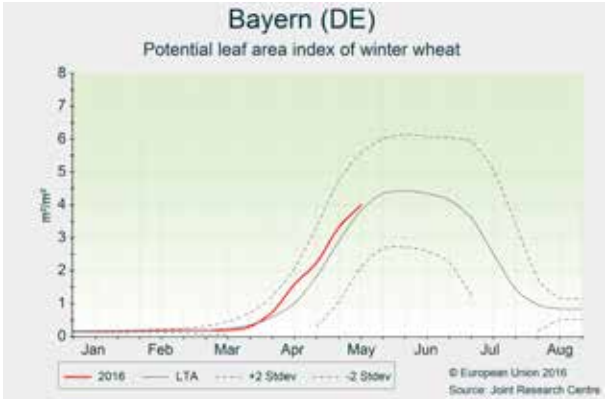
Fair yield outlook despite relatively cool and unsettled weather

Winter cereals are generally in good shape after the mild winter and a period of unsettled weather in April and May. The cold spell in late April and early May did not affect crops. More rain is needed in the north-east to sustain crop growth.

The weather in April was unsettled, with a warm period at the beginning and a cold spell towards the end of the month, when an inflow of polar air masses determined below-average temperatures, light night frosts and some snow. Temperatures were around average, and crop development slowed down. Precipitation was unevenly distributed: overly wet in the south-west (e.g. *Baden-Württemberg*) with some torrential rains and thunderstorms, and relatively dry with fewer rainy days than usual in the north-east (e.g. *Sachsen-Anhalt*). The relatively dry period in the north-east persisted into May, creating a considerable rain deficit, particularly in *Sachsen-Anhalt*. Temperatures at the beginning of May were still determined by polar air masses but peaked between 6 and 12 May. The rain-free period and mild- to warm air temperatures allowed for the completion of the maize-sowing activities that had been delayed by the cold spell and rainy weather in the south, and favoured the emergence of sown crops. The extent to which the delayed sowing activities and low soil temperatures will influence maize yield potential is yet to be seen. Winter cereals are generally in good shape, with adequate biomass development. In the north-east, however, more rain is needed to sustain crop growth. The yield forecast is above the five-year average. Rapeseed is at the flowering stage, and no damages are reported from the cold spell and the relatively cool period. The forecast is maintained at above the five-year average.





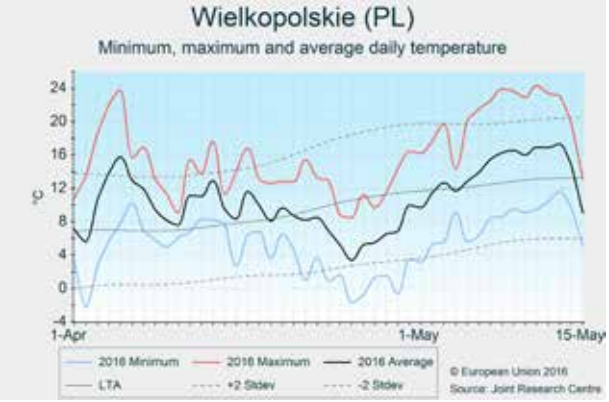


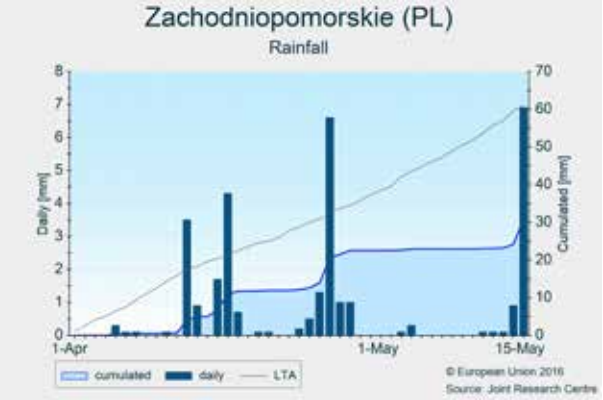
Poland

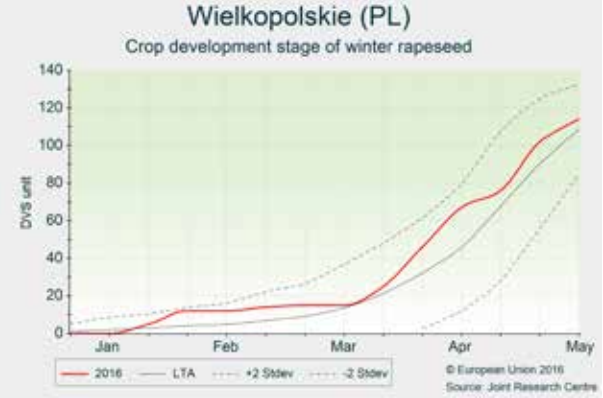
Pessimistic outlook due to poor conditions for winter crops

Conditions since the start of the season have been poor for winter cereals. The current dry conditions in north-western regions are of concern. Yields of winter wheat and rapeseed are revised downwards to below the five-year average. Spring barley, grain maize, sugar beets and potatoes are benefiting from good conditions in most regions.

In early April, average temperatures remained 3 °C above the climatological norm, but then decreased to greatly below average during the last dekad of April, when a cold spell hit the country, particularly western regions. In these regions, temperatures were negative for two days in late April. The cold temperatures observed hampered the recovery of crops from the poor conditions observed since the start of the season, namely dry conditions during the sowing period, and frost kill in January. Winter rapeseed and winter wheat were slightly advanced due to the mild winter conditions, but the cold snap led development to return to close to the average. The cold spell impacted the emergence of potatoes and maize, and slightly delayed the development of spring barley. In most regions, cumulated rainfall has been close to the average since the beginning of the year. North-western Poland experienced a water deficit from the beginning of the year until mid-May. Pomorskie and Zachodnopomorskie had two weeks (from late April to 14 May) without any significant rainfall. In the north, the dry conditions were unfavourable for the emergence of potatoes, sugar beets and rapeseed. The yields of winter wheat, rapeseed, winter barley, rye and triticale are forecast to be below the five-year average as a result of the accumulation of poor conditions since the start of the season. Maize, potatoes and sugar beets are forecast to be close to the average, and their outlook is currently positive in the most productive regions.







United Kingdom and Ireland

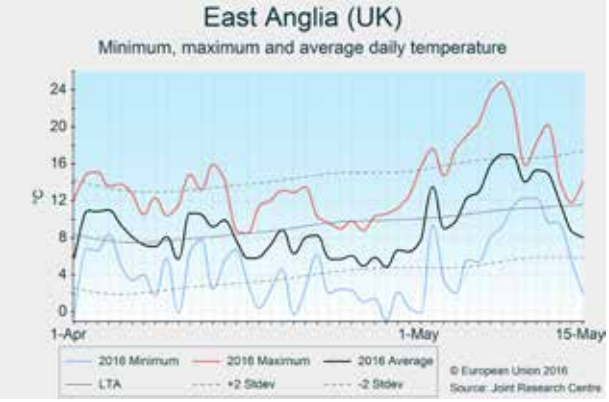
Fair outlook despite difficult April weather

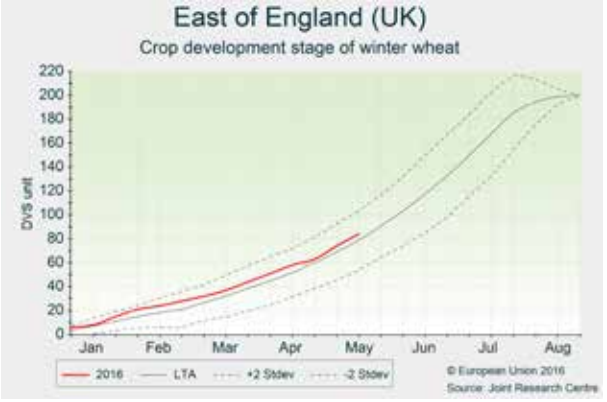
Rainfall and temperature conditions strongly fluctuated during the period of review. Sowing was delayed due to wet conditions and a cold period stalled development. May, so far, generally presented favourable conditions, allowing spring sowings to be completed and young stands to recover. Yield outlooks remain close to average.

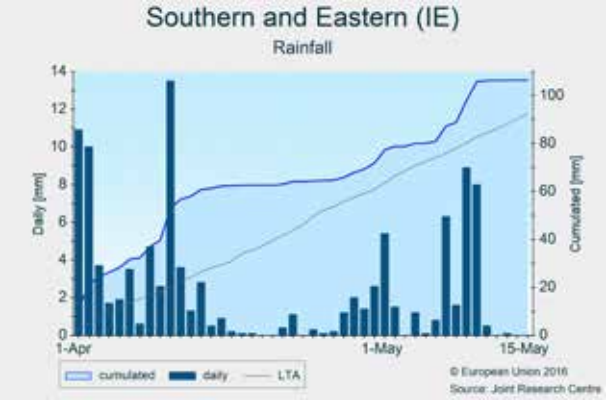
In the UK, the first half of April was characterised by around-average or just-above-average temperatures, followed by a distinctly colder-than-usual period, especially in the north, until the first days of May. In Ireland, below-average temperatures predominated throughout this period. The rest of May was significantly warmer than usual, in both countries, but temperatures dropped again at the end of the reporting period. Temperature sums for the period as a whole were close to the long-term average.

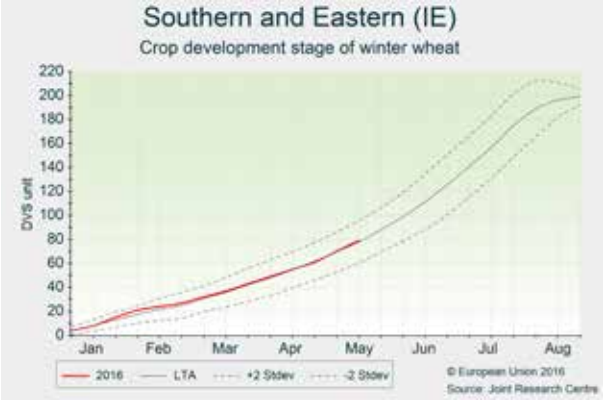
Rainfall was frequent and above average during the first half of April, followed by a relatively dry period until about the 25th, after which the frequency of rain events increased again, until the first days of May in the UK, and about 10 May in Ireland. The rest of May presented few rainfall events so far. Rainfall for the period as a whole was above-average in most cropland areas in both countries.

Winter crops are faring well. Development is slightly advanced in most of the UK and close to average in Ireland. Pest and disease pressure remains high. Farmers often experienced difficulties to conduct timely field operations due to wet conditions. Planting of spring barley, sugar beet and potato experienced delays, extending into May. Emergence and development of early sown crops lagged behind due to the cold snap in April but recovered well in May. The yield forecasts for winter crops remain close to or slightly above the five-year average. The forecasts for spring crops are still based on the long-term trends.









Spain and Portugal

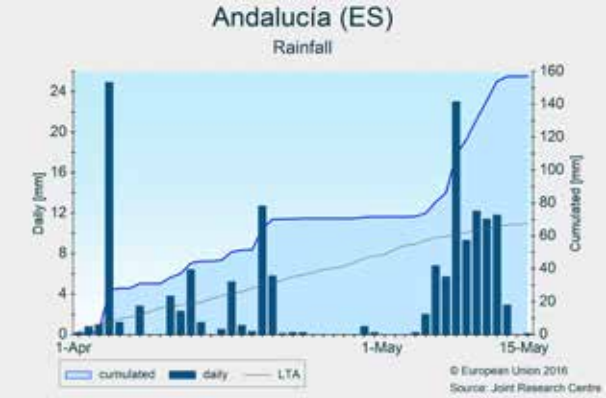
Positive outlook for winter crops

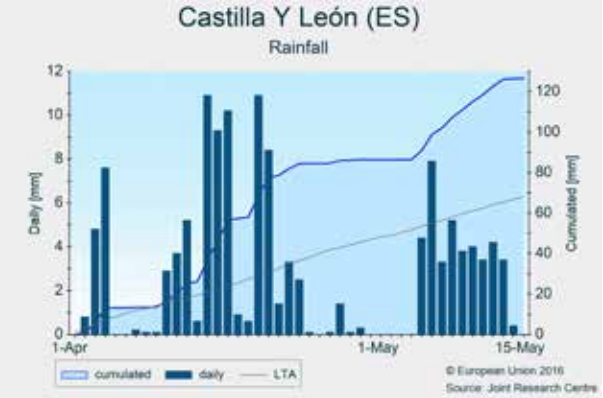
The grain-filling phase of winter cereals has begun under favourable conditions: soil moisture levels are high thanks to abundant precipitation in April and the first half of May. These humid conditions, however, are delaying the sowing of sunflower and maize in north-western areas.

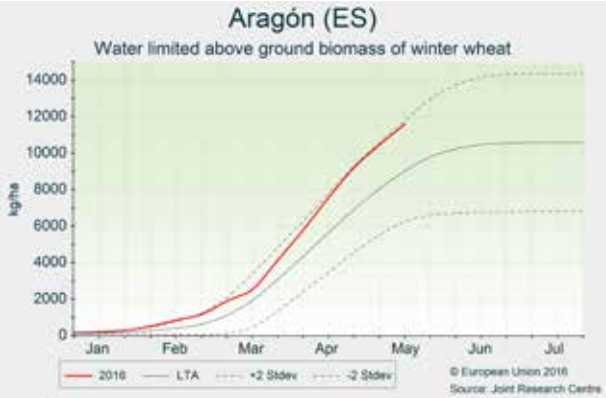
Total precipitation from April to mid-May has been almost twice that of an average year in most of the main cereal-producing regions at the centre and west of the Iberian Peninsula (*Castilla y León, Castilla La Mancha* and *Andalucía*). Rainfall was concentrated in two periods: the first two dekads of April and the second week of May. Average temperatures during these two periods were unusually low: 3 to 4 °C below the long-term average. By contrast, both precipitation and temperature were close to the long-term average in the eastern regions of Aragón and Cataluña.

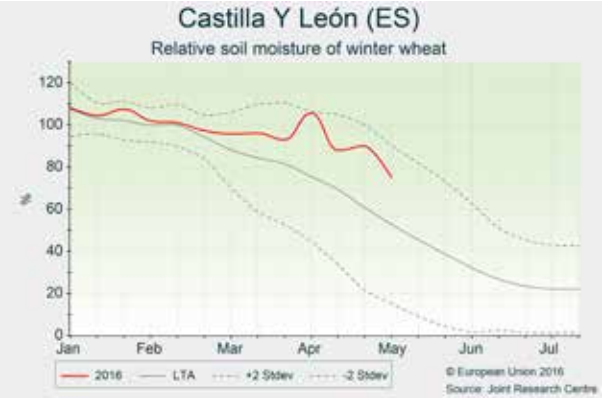
Winter crops are in very good condition. In Andalucía, the abundant rainfall that occurred during the critical grain-filling phase of wheat was essential to prevent damage after a rather dry start to the season. In central and northern regions, the vegetative growth of winter cereals is unusually high, and the high soil moisture levels depict a positive scenario for the grain-filling phase, which has just started in these areas.

Conversely, the heavy rainfall of the second week of May is delaying the sowing of sunflowers and maize in *Castilla y León*. The high soil moisture, especially in the westernmost provinces of the region (*León, Zamora, Salamanca*), impedes access to the fields. The level of precipitation in the coming two weeks will determine the extent to which summer crops may have been affected by these adverse conditions.









Italy

Generally positive outlook for winter crops

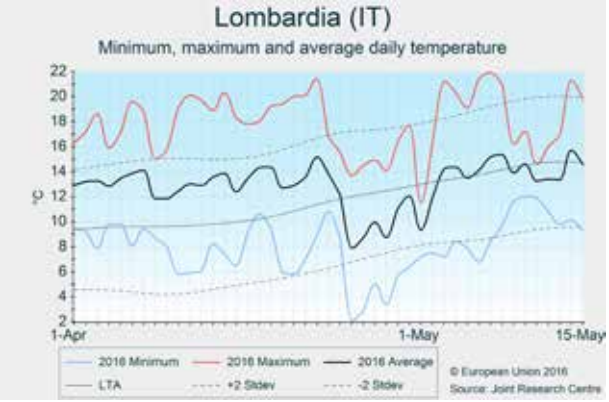
Winter crops (which are in the grain-filling phase) benefited from favourable agro-meteorological conditions. Soil moisture levels were adequate, with the exception of Sicilia, where there was insufficient rain to replenish soil water levels. Northern regions were hit by abundant rain and potentially harmful hailstorms locally.

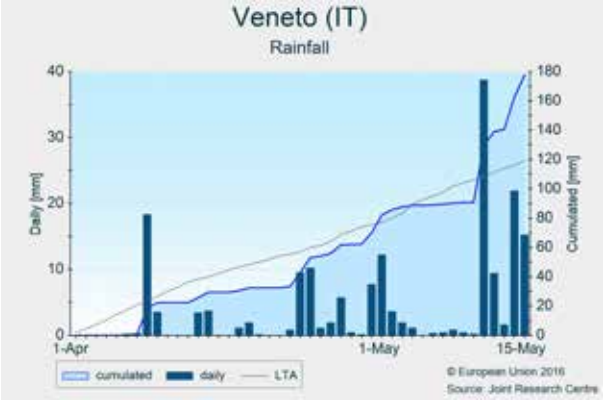
In Italy, warm conditions prevailed during the first two dekads of April. During the remaining period under review, temperatures were close to average across the country, but the last dekad of April was rather cold in the north. Cumulated precipitation since 1 April has been above or close to the average in most of the country, but the islands (Sicilia and Sardegna) received 30 % to 40 % less rain than usual. Particularly in Sicilia, dry conditions have persisted since the beginning of the season.

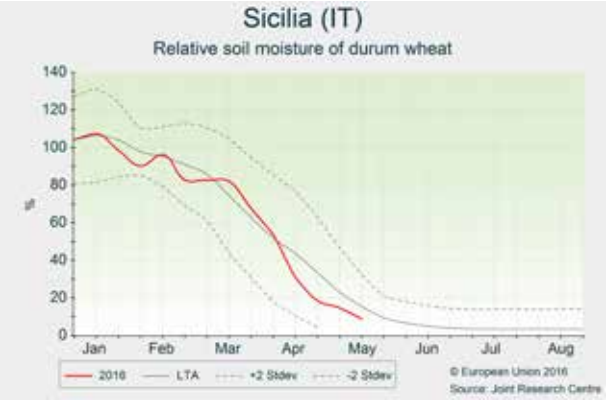
Wheat and barley are at the beginning of grain-filling stages (watery ripe stage) in northern regions, while mealy ripening has already started in southern areas. Durum wheat growth in Sicilia was negatively affected by drought, as confirmed by crop models and remote sensing indicators. The other major areas for producing durum wheat (Puglia, Marche and Basilicata) are benefiting from the optimal conditions for the grain-filling phase.

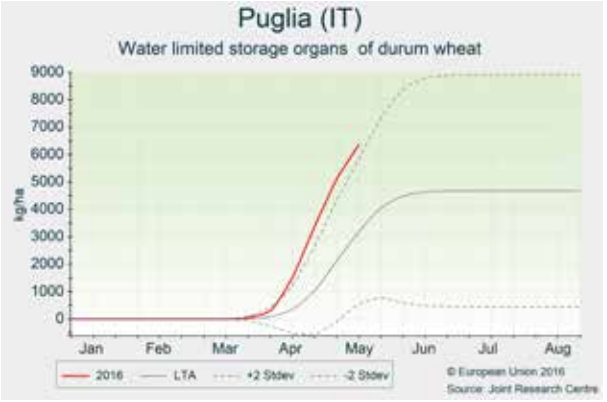
Maize-sowing operations were completed with relatively little delay due to frequent light rain, and warm temperatures and adequate soil moisture levels were ideal for prompt emergence. However, during the second dekad of May, northern regions (Veneto, Lombardia and Emilia Romagna) were locally hit by hailstorms and torrential rains, which were potentially harmful, particularly for young maize stands.

The yield forecasts for winter cereals and rapeseed are based on a scenario analysis, and are slightly above the trends. For the other crops, only trends were used at this stage.









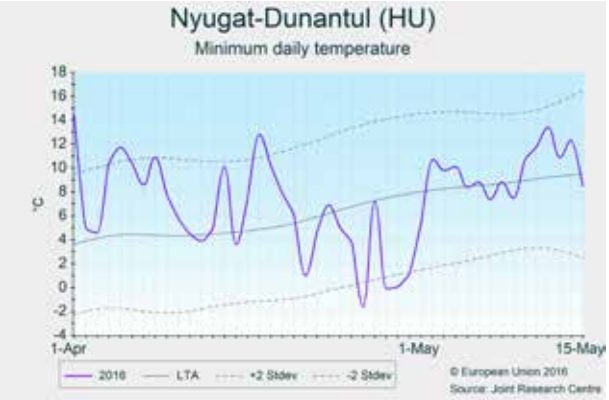
Hungary

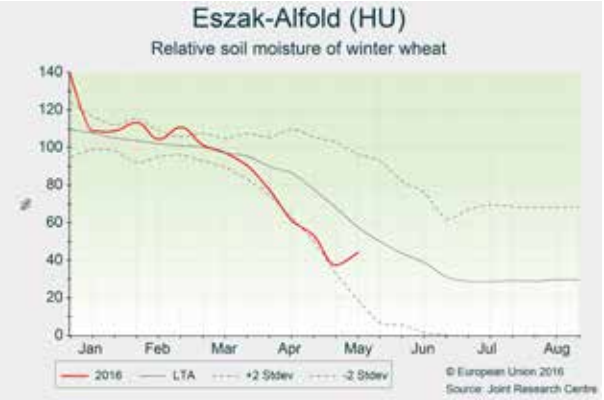
Advanced crop season with adequate water supply and good expectations

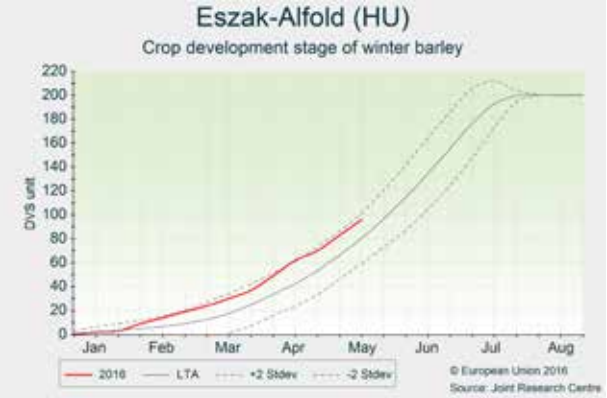
During the period under review (1 April-15 May) there was an overall positive thermal anomaly of 1 °C to 2 °C in eastern areas, while temperatures remained in the normal range in the west. Some frost events occurred in late April. The amount and timing of the rainfall were adequate both for the water supply of winter crops and the spring sowing campaign.

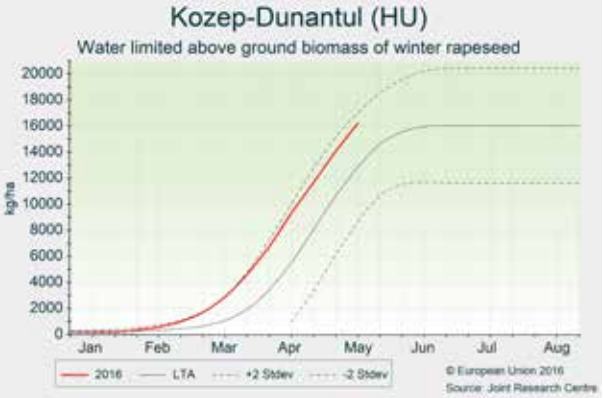
The first two dekads of April were much warmer than usual, followed by a cold spell in late April. Temperatures in May have been near average so far. Significant late frost events occurred from 26 to 30 April in western Hungary. The most severe damages occurred along the southern and western borders, where maize leaves and potato seedlings may have suffered frost injuries. After a wet March, rain became infrequent in the first two dekads of April, leading to a reduction in top-soil moisture content and allowing for the timely sowing of sunflowers, potatoes and (later) maize. Near- or above-average precipitation occurred in late April and the first half of May, Some eastern regions have a moderate (3040 mm) rainfall deficiency, but recent rainfall could improve this situation.

The development of winter crops is well advanced. As the canopy expansion of winter cereals is adequate, and biomass accumulation greatly exceeds the average, a high yield forecast is maintained and might be further increased in the upcoming Bulletins should favourable weather occur during the yield formation period. The remote sensing information confirms this positive outlook, but indicates high spatial variability.









Romania

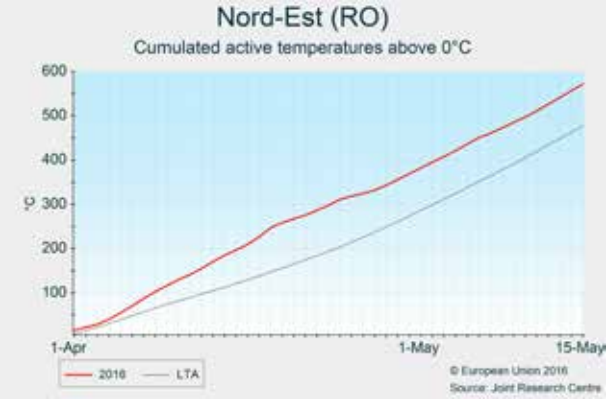
High yield potential for winter crops

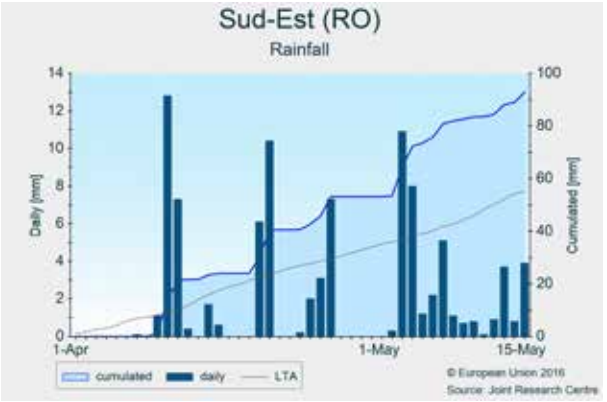
The period of review was characterised by plentiful precipitation in most of Romania. Soil moisture levels are restored to close to field capacity, except in some smaller areas along the western border of Romania. Winter crops are in good condition, and yield expectations are high. The sowing campaign of maize and sunflowers was completed with little or no delay, despite ample rainfall. The emergence/early development of summer crops is adequate.

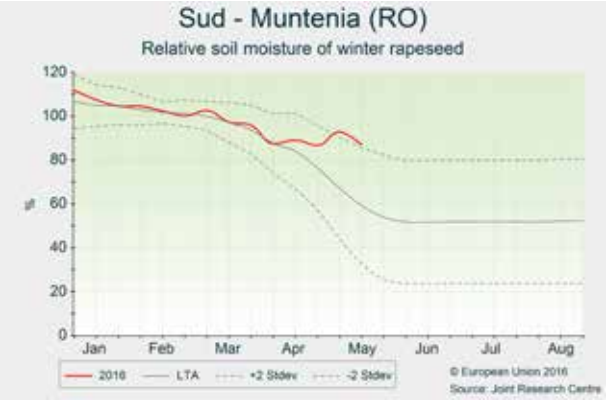
The first two dekads of April were extremely warm, with daily temperatures mostly exceeding the average by 5 to 7 °C. During the last dekad of April, temperatures dropped to below average in western Romania, where some light frost events (Tmin > – 3 °C) were observed. In May, near-average thermal conditions became widespread. The active temperature sum (Tbase = 0 °C) indicates a surplus of 50 to 100 growing degree days (GDD) in most of Romania for the review period as a whole.

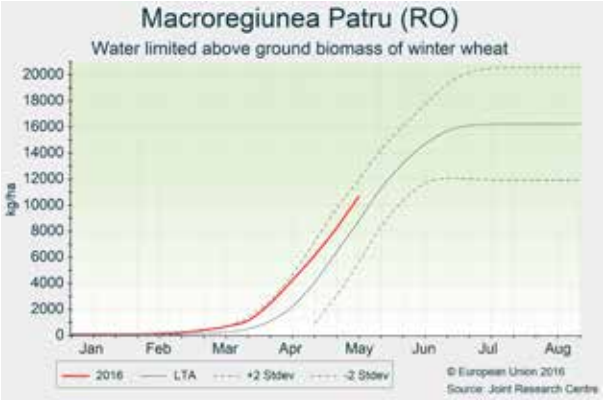
April started with moderate precipitation, but rainfall later became frequent and abundant in the whole of Romania. Total precipitation exceeded 100 mm in central regions but remained moderate (40 to 80 mm) along the eastern and western borders. Favourable mild and dry weather conditions in early April enabled an early start to the spring sowing campaign, but ample rainfall later hampered field activities. No constraint is expected for the sprouting and emergence of spring crops.

The development of winter cereals is advanced by two to three weeks, whereas indicators for rapeseed suggest an even higher precocity in the south-eastern regions. The plentiful water supply was especially beneficial for rapeseed during the flowering and early grain-filling periods. Taking into account the above-average biomass accumulation of winter wheat and the adequate soil moisture levels, the yield outlook is very positive.









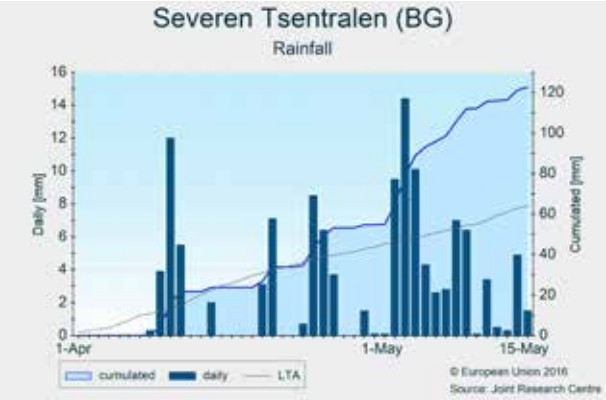
Bulgaria

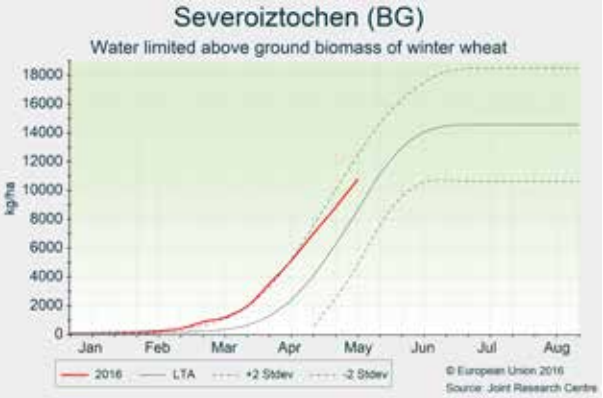
Positive yield outlook

Precipitation exceeded the average by 40 to 70 mm between 1 April and 15 May. Temperatures during the first two dekads of April were predominantly well-above average, and fluctuated around average for the rest of the review period. Crop indicators suggest a very good crop status. The yield outlook for winter crops is positive.

Considering the review period as a whole, temperatures exceeded the average by 1 to 2°C in north-western Bulgaria, and by 2 to 3°C in south-eastern regions. Temperatures during the first two dekads of April were substantially higher than usual. Abundant rainfall was typical for the period under review. The cumulated precipitation reached 100 mm almost everywhere in Bulgaria, exceeding the average by 50 to 100 %. The climatic water balance since the beginning of October also indicates a considerable surplus (80 to 220 mm above the long-term average). Rainfall was mainly concentrated in the last dekad of April and early May. The drier conditions before and after this period allowed the sowing of sunflower and maize crops to be completed on time or with a moderate delay. The mild thermal and wet soil conditions provided good conditions for sprouting and the early growth of summer crops.

The development of winter barley and soft wheat is advanced by 10 to 20 days, and grain filling has started in the South. Soil moisture was favourably replenished under winter crops, reaching a much higher level than usual for mid-May. Our model simulations suggest well-above average biomass accumulation of winter crops. High yield forecasts are therefore maintained.





Austria, Slovakia and the Czech Republic

Cold spell at the end of April affected winter rapeseed and early sown summer crops

Warmer-than-seasonal weather during the first two dekads of April was followed by a cold spell at the end of April. The influence of the cold spell on crops was spatially highly variable, but mainly affected winter rapeseed and emerged summer crops. The first half of May was characterised by seasonal temperatures and wet conditions in Austria.

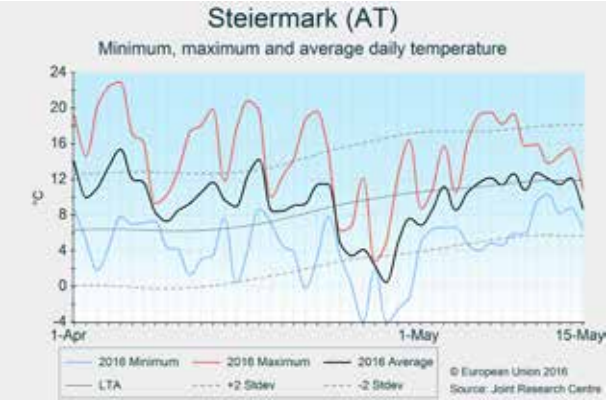
The first two dekads of April were 2 °C to 4 °C warmer than the long-term average in the Czech Republic, northern Austria and western Slovakia, whereas temperatures elsewhere were 4 °C to 6 °C warmer than usual. This exceptionally warm weather accelerated the development of winter crops and led to the early sowing of summer crops.

The inflow of cold air over central Europe caused a sudden drop in air temperatures in the third dekad of April. Consequently, average daily air temperatures were between 2 °C and 6 °C below seasonal values. Minimum daily air temperatures of between – 4 °C and – 2 °C were recorded in the main agricultural areas. Minimum daily air temperature fell below 0 °C for three to five days, with longer periods recorded in *Kärnten* and *Steiermark* in Austria, and large areas of the Czech Republic. Spatially, the cold spell had a highly diverse impact on crops, depending mainly on the lowest temperature and the development stage of plants. The most affected regions were in Austria and Slovakia. Of all crops, winter rapeseed was most exposed to freezing temperatures. In areas with snow cover, heavy snow might also have caused physical damage to winter crops by bending the stalks. The greatest depth of snow layer was recorded in Kärnten and Steiermark, ranging from 10 to 20 cm. Grain maize and potatoes had already emerged at the time of the cold spell in many regions of Austria and Slovakia, due to early sowing. As the tolerance to freezing temperatures at the stage after emergence is very low, these crops may also have suffered from the frost.

Air temperatures returned to normal during the first half of May. However, the recovery of damaged crops in Austria and Slovakia after the cold spell was slow due to wet conditions and the lack of sunshine.

The period under review was generally wetter than usual for large areas of Austria, the eastern half of the Czech Republic and the western half of Slovakia.

The overall yield outlook for winter crops has been slightly reduced due to recent weather events. It is still too early to assess the influence of the unfavourable weather at the end of April on final yields of summer crops, as crop recovery and replanting (where necessary) may yet occur.

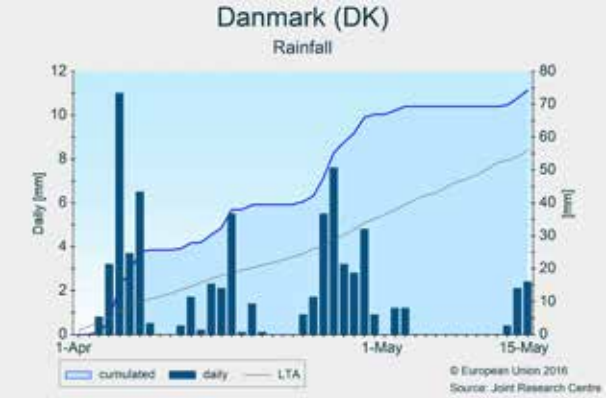


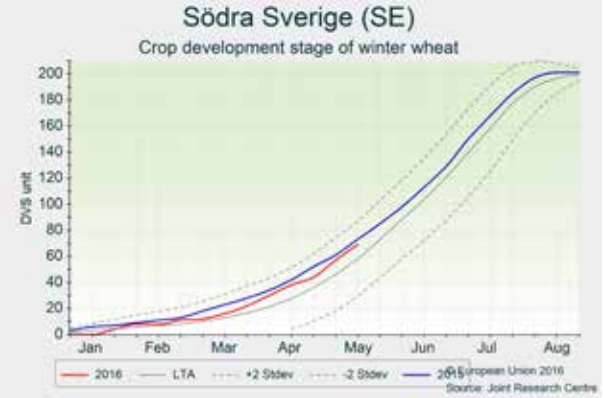
Denmark and Sweden

Positive outlook for winter cereals

Predominantly warm and wet conditions continued to prevail in Sweden and Denmark. Winter crops are in very good condition and present a positive yield outlook. On the other hand, this period presented several obstacles to the sowing of spring barley, but May presented a convenient sowing window.

Temperatures continued to be warmer than usual in both countries for the first two dekads of April. During the third dekad, temperatures dropped below average, and minimum temperatures reached – 4 °C in Denmark and southern regions of Sweden. Rainfall events were frequent throughout April, with the exception of two short windows around 10 and 20 April. The rainfall accumulation for April is well above average. Danish farmers took advantage of the short windows and managed to complete some sowing of spring barley. At the beginning of May, the rain stopped and temperatures started to increase again to above-average values, thus presenting a convenient sowing window. It is expected that both countries will benefit from this window to complete the sowing of the spring barley and grain maize. Especially in Denmark, the sowing of spring barley was widely distributed over time (i.e. from the end of March to mid-May). The sowing of sugar beets and potatoes was carried out earlier in March and completed on time, also because of the limited cultivation area. Winter cereals are generally in good condition, presenting advanced development and biomass accumulation. Yield forecasts for winter cereals, which were made based on scenario analyses, are above the five-year average and close to the good levels of 2015. Trends and averages have been used to forecast the yields of spring barley, grain maize, sugar beets and potatoes at this early stage.



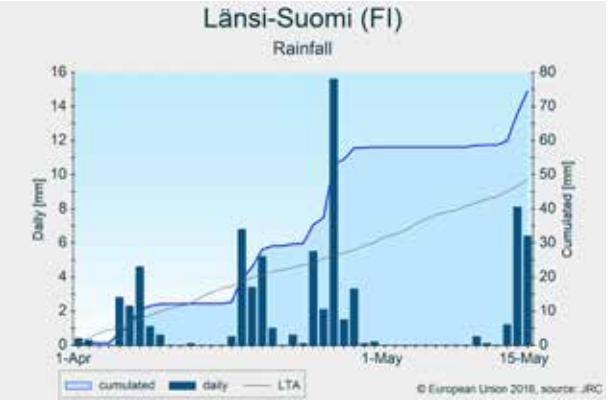


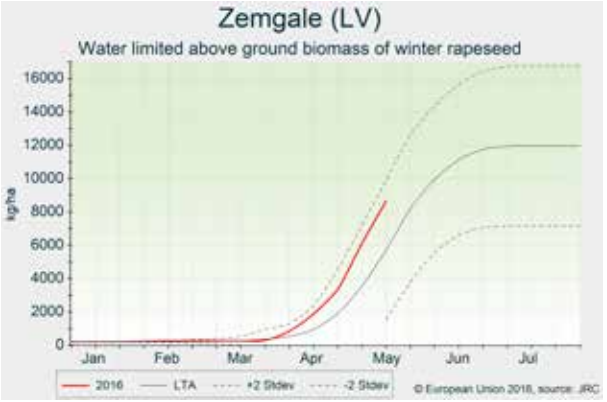
Finland, Lithuania, Latvia and Estonia

Spring-sowing campaign concluding with no major constraints

The spring sowing campaign is practically completed in the Baltic countries, and is expected to be completed in Finland during the coming days. Overall, winter crop development is above average.

In all countries, weather indicators strongly fluctuated throughout the period under review (1 April-15 May). Above-average temperatures and low precipitation in the first half of April were followed by colder and wetter-than-usual conditions in mid-April. In May, the weather returned to warmer-than-seasonal temperatures and unusually dry conditions. Indeed, no rains were recorded from 1 to 15 May. The mild conditions experienced this spring allowed for the sowing-campaign to start around one dekad earlier than usual in most areas. Scattered and heavy rains in mid-April hampered spring sowings and the fertilisation of winter crops. Nevertheless, the lack of precipitation in May provided a wide window of positive conditions for field work. The higher-than-usual temperatures in May also boosted the development of winter crops (mostly comprised of wheat, rapeseed and rye), which are now coming to the end of their pre-flowering phase. Both remote sensing signals and simulated crop indicators show above-average progress, particularly in Zemgale and Siauliu. Marijampoles is the only region which was severely affected in January by frost-kill damage (predominantly of winter rapeseed), and as a result was re-sown this spring. Yield forecasts are close to the five-year average, except for rye and triticale, which present slightly above-average prospects.





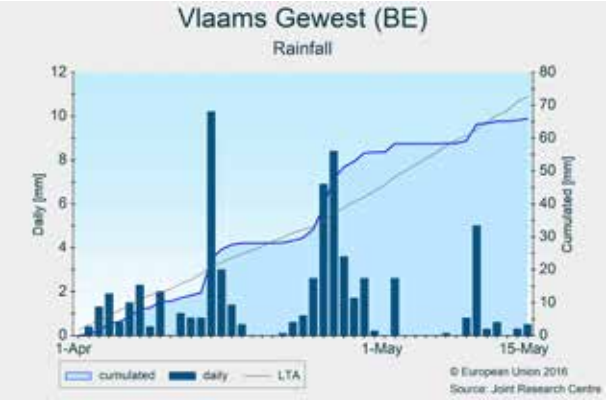
Belgium, the Netherlands and Luxembourg

Fairly positive outlook

Temperature and rainfall during the review period fluctuated strongly but were close to average as a whole. Overall, weather conditions during the season so far have been free of serious constraints but have not been exceptionally favourable either. Yield forecasts are close to the trend.

The period under review (1 April-15 May) presented large temperature fluctuations, with predominantly above-average temperatures during the first half of April and from 4 to 13 May, and mainly below-average values in the second half of April and the last few days of the review period. Some very light frost events occurred during the second half of April. For the period as a whole, temperature sums were around average; somewhat above-average in the coastal areas. Rainfall totals were close to average, with many events in April. The first half of May was drier than usual, with few rainfall events, especially in the Netherlands and northern Belgium. Radiation was well above average, thanks to the sunny conditions in May.

Overall, weather conditions during the season so far have not raised serious concerns, but have not been exceptionally favourable either. Winter crops development, leaf area index, biomass accumulation and soil water reserves are close to or just above seasonal trends. Spring sowings and emergence encountered difficulties due to the predominance of wet conditions in March and April and the cold spell, but crops recovered well in May. The yield forecasts for winter crops are now based on scenario analysis, but remain very close to last month's figures which were based on trends.



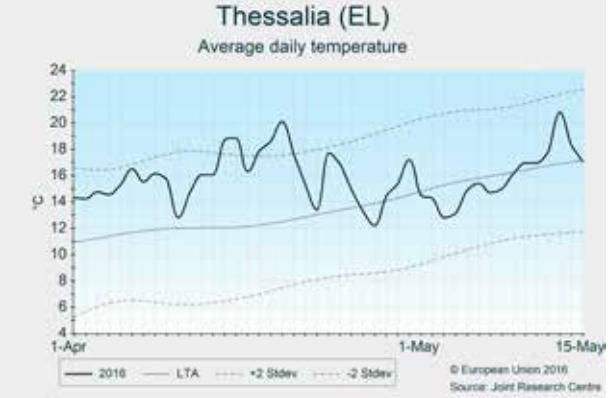
Greece and Cyprus

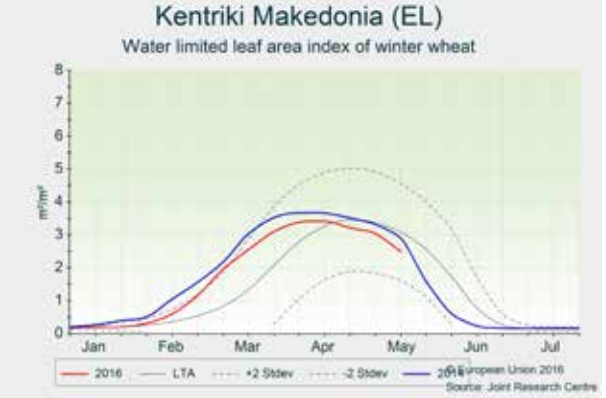
Favourable rainfall in Greece; negative outlook for Cyprus

Weather conditions for winter cereals in Greece were unfavourable until 20 April, but since then soil moisture has been replenished by several rainfall events. These rainfall events also helped the emergence of grain maize that had been sown by mid-April. Prolonged warm and dry conditions in Cyprus negatively impacted winter barley.

In Greece, very warm and dry conditions prevailed during the first two dekads of April, leading to high evapotranspiration rates and drastically decreasing the soil moisture levels. However, several rainfall events occurred during the third dekad of April and since the beginning of May, leading temperatures to return to average levels. Soil moisture improved significantly at the very crucial grain-filling development stage of winter cereals, especially in the northern parts of the country. Concerns regarding serious yield losses of winter cereals are no longer valid. Moreover, the fungal diseases that were mentioned in our previous Bulletin remained restricted, and caused no significant yield losses. The development stage is currently advanced, and the biomass accumulation is high. In addition, because of April's dry conditions, the sowing of grain maize occurred rapidly during a few days around mid-April, and the subsequent rainfall events facilitated its emergence. Grain maize is at the two leaves stage or more advanced. Forecasts are based on scenario analyses for winter cereals, and on trends and averages for grain maize and sunflower. The outlook for winter cereals is slightly below the five-year average.

In Cyprus, temperatures remained consistently above the long-term average for the period under consideration, following an already warm period. The low levels of precipitation that occurred around mid-April were insufficient to replenish the soils, and those that occurred by the beginning of May came too late. The harvesting of winter barley has already begun, and low yields are recorded. However, durum wheat, which is partly irrigated, has been less impacted by the aforementioned conditions. Scenarios have been used to forecast crop yields.



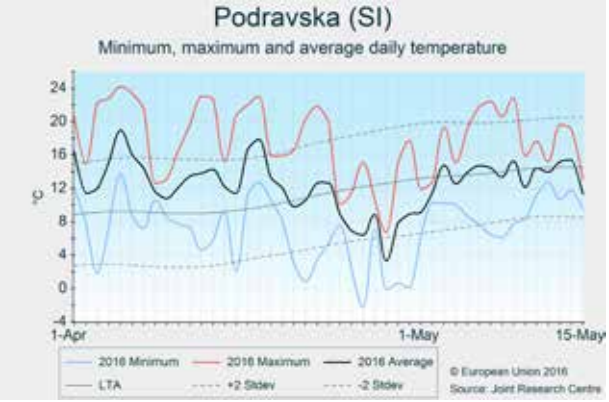


Slovenia and Croatia

Cold spell affects winter rapeseed and early sown summer crops

Exceptionally warm weather during the first two dekads of April was followed by a cold spell at the end of April. The cold spell mainly affected winter rapeseed and already emerged summer crops. The first half of May was characterised by seasonal temperatures and wet conditions in Slovenia and the western half of Croatia.

Exceptionally warm weather during the first two dekads of April accelerated the development of winter crops and led to the early sowing of summer crops. Maximum daily air temperatures reached above 28 °C in the eastern part of Croatia. The inflow of cold air caused a sudden drop in air temperatures in the third dekad of April. Minimum daily air temperatures of between – 4 °C and 0 °C were recorded in the main agricultural areas. The length and impact of the cold spell was regionally highly variable; generally two to five cold days occurred in Slovenia, compared to one to two days in the main agricultural areas of Croatia. Of all crops, winter rapeseed was the most exposed to freezing temperatures. A snow layer was recorded in large parts of Slovenia (except in north-eastern areas) and to a lesser extent in Croatia. The snow layer, where it was present, caused the stalk to bend, which could further affect the growth of winter cereals. Grain maize and potatoes had already emerged in many regions of Slovenia and Croatia when the cold spell occurred, due to early sowing. As the tolerance to freezing temperatures at the stage after emergence is very low, these crops may have suffered from frost damage. The recovery of damaged crops during the first half of May was slow due to wet conditions and the lack of sunshine in Slovenia. Temperatures returned to seasonal values during the first half of May. Normal precipitation cumulates were recorded in Slovenia in April, whereas a slight rainfall deficit was observed in Croatia. The first half of May was wet in Slovenia and the western half of Croatia, with rainfall cumulates regionally exceeding 90 mm. The overall yield outlook for winter crops has been slightly reduced due to recent weather events. It is still too early to assess the influence of the cold spell on the final yields of summer crops, as subsequent crop recovery and replanting (where necessary) may yet occur.



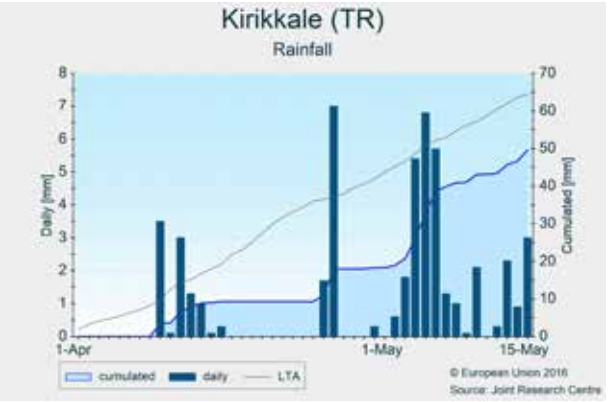
3.3. Black Sea Area

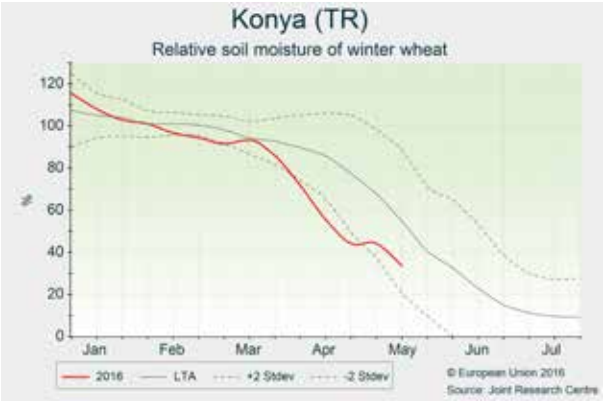
Turkey

Unfavourable conditions for winter cereals

Prolonged warm and almost dry conditions have negatively impacted the yield formation of winter cereals. Rainfall that occurred in mid-April and at the beginning of May somewhat improved crop conditions, but not enough to reverse the picture. Grain maize was sown in April, and May's rainfall helped its emergence.

Weather conditions remained warm in Turkey for the whole period of review (1 April to 20 May). More specifically, average daily temperatures fluctuated above the long-term average, following an already warm period. Temperatures dropped to around average only in some western regions. Precipitation was sparse until mid-April, with the exception of the region of Bati Karadeniz where several rainfall events occurred during the third dekad of April. Soil moisture conditions improved as a result of rainfall events in early May, but still remain below average (e.g. Konya). Winter cereals are at the grain-filling stage, which could be negatively impacted by a lack of water. Therefore, rainfall would be beneficial in the next couple of weeks, before the ripening phase. The sowing of grain maize started in the first dekad of April and (after a short interruption around mid-April) was completed by the end of April. Furthermore, the rainfall events that occurred at the beginning of May helped the emergence of the plants. Forecasts for winter cereals are below the five-year average, and are based on scenario analyses. The trend has been used to forecast grain maize yields at this early stage.





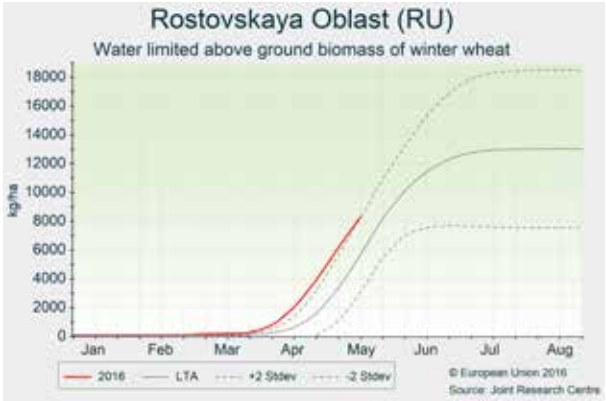
3.4. European Russia and Belarus

European Russia

Good winter crop conditions

During the first 20 days of April, temperatures in general greatly exceeded the long-term average, leading to a 2-5 °C positive thermal anomaly in the central and southern territories of Russia. From the third dekad of April, temperatures returned to near-average values. Considering the review period as whole, below- or near-average precipitation typified most of southern and northern Russia, enabling the good progress of the spring sowing campaign. Abundant rains occurred in central Russia, primarily in the southern half of the Central Okrug and the western regions of the Near Volga Okrug, causing delays to the sowing of spring crops.

Winter cereal development is advanced by two to three weeks in southern Russia and by one to two weeks in northern and eastern regions. Water supply and thermal conditions have been adequate, and biomass accumulation and crop canopy expansion are well above average. Remote sensing images confirm the very good overall crop conditions, but still indicate weak winter crop growth and status, primarily in *Belgorodskaya* and partly in the Kurskaya Oblasts. At national level, the yield outlook for winter cereals is promising.

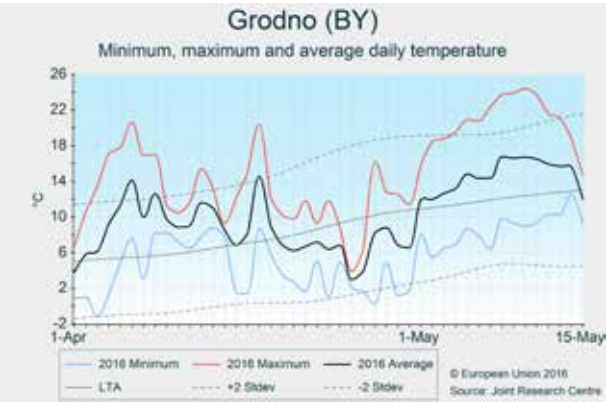


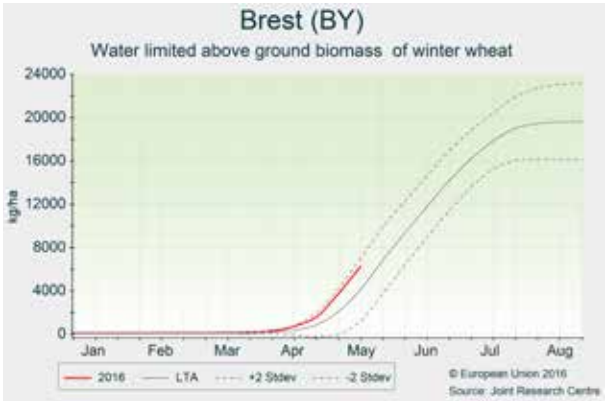
Belarus

Positive outlook for winter crops

After a mild winter and start to spring, the agro-meteorological conditions in Belarus remained generally favorable for crop growth during the review period (1 April-15 May). In fact, rainfall was close to average across the country, and overall temperatures were warmer than usual.

The only exception was observed during the last dekad of April, when a cold period hampered crop development and worsened the spring-sowing conditions. Since the beginning of May, however, higher temperatures and appropriate soil water levels ensured optimal conditions for crops and allowed for the fast completion of maize-sowing operations. As a consequence, the overall outlook is good for all cereals, and is particularly positive for winter wheat, the yield of which was revised upwards and is now well above the five-year average.





3.5. Maghreb

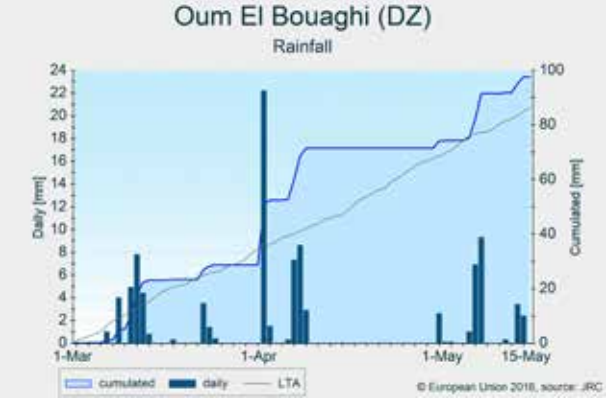
Morocco, Algeria and Tunisia

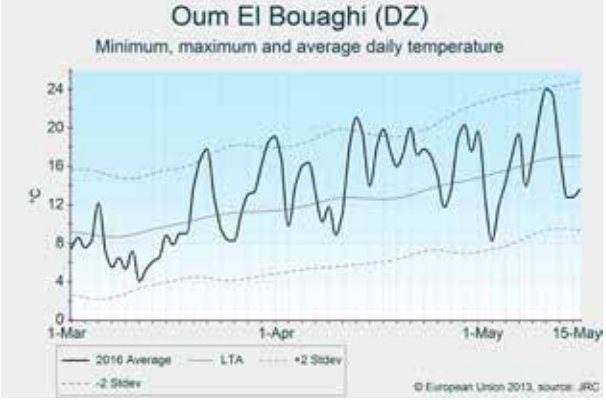
Negative and positive conditions, mixed outlook for Algeria and Tunisia

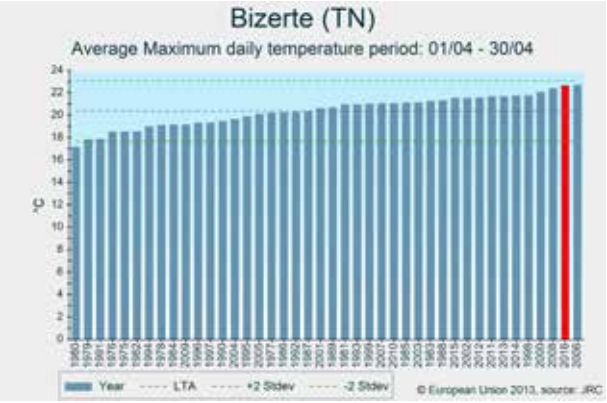
In April, temperatures were unusually warm in the Maghreb. The yield outlook for winter cereals remains mixed: good precipitation levels in eastern Algeria keep expectations positive in this region, whereas the outlook for western Algeria and Morocco is extremely negative. In Tunisia, the relatively good forecast for winter cereals was tempered due to constraints in coastal regions during the grain-filling stage.

In the eastern half of Algeria, winter cereals benefited from rain in the first dekads of April and May, which provided adequate soil moisture to sustain growth during the grain-filling stage. The prospect remains good in the eastern willayas, which produce an important share of winter cereals in Algeria. This mitigates the negative impact at national scale of the extremely dry conditions that prevailed from November to February in the western areas of the country. Yields of wheat and barley are forecast to be close to seasonal values.

In the northern Tunisian governorates of Bizerte and Beja, scarce precipitation and unusually high temperatures in April coincided with the critical grain-filling phase. Remote sensing observations suggest a shortening of the grain-formation process, which led our previously highly positive yield expectations in this area being revised downwards to a moderately good prospect. In the region bordering Algeria (e.g. Le Kef, Jaouba), rains in April were more abundant and the outlook is favourable so far. These two north-western areas account for most of the Tunisian cereal cultivation, especially for wheat; thus, at national level, the yield forecast is now slightly higher than average. Expectations for barley are lower due to the dry conditions experienced throughout the vegetative phase in central Tunisia, where winter barley is more typically grown. The negative yield outlook for winter cereals in Morocco is maintained.







4. Crop yield forecasts

Country	TOTAL WHEAT t/ha					TOTAL BARLEY t/ha				
	2015	2016	Avg 5yrs	%16/15	%16/5yrs	2015	2016	Avg 5yrs	%16/15	%16/5yrs
EU-28	6.02	**5.85**	5.60	-2.8	+4.5	5.02	**4.99**	4.72	-0.7	+5.7
AT	5.58	**5.40**	5.37	-3.3	+0.4	5.54	**5.17**	5.38	-6.7	-4.0
BE	9.42	**8.94**	8.84	-5.1	+1.1	9.32	**9.20**	8.63	-1.4	+6.6
BG	4.54	**4.66**	4.12	+2.6	+13.2	4.04	**4.14**	3.86	+2.3	+7.1
CY	2.91	**2.16**	2.26	-25.8	-4.6	2.49	**1.59**	1.82	-36.3	-12.8
CZ	6.36	**6.02**	5.71	-5.3	+5.4	5.44	**5.03**	4.93	-7.6	+1.9
DE	8.09	**8.12**	7.81	+0.4	+3.9	7.17	**6.91**	6.61	-3.7	+4.5
DK	7.93	**7.72**	7.34	-2.6	+5.2	6.12	**5.83**	5.79	-4.8	+0.7
EE	4.79	**3.78**	3.82	-21.0	-1.0	4.23	**3.36**	3.38	-20.6	-0.7
ES	2.92	**3.45**	3.07	+18.2	+12.6	2.46	**3.19**	2.73	+29.6	+16.6
FI	4.10	**3.85**	3.82	-6.1	+0.7	3.46	**3.54**	3.54	+2.1	-0.0
FR	7.79	**7.49**	7.20	-3.8	+4.1	7.09	**6.82**	6.49	-3.8	+5.1
GR	3.02	**2.87**	3.00	-5.1	-4.4	2.60	**2.68**	2.81	+2.8	-4.6
HR	5.39	**5.01**	4.96	-7.1	+1.0	4.39	**4.73**	4.36	+7.8	+8.6
HU	5.14	**5.24**	4.49	+2.0	+16.8	4.82	**4.96**	4.24	+2.9	+17.1
IE	10.66	**10.14**	9.23	-4.9	+9.9	8.58	**8.02**	7.78	-6.5	+3.1
IT	3.93	**3.97**	3.89	+1.0	+2.0	3.91	**3.76**	3.72	-3.9	+1.2
LT	5.24	**4.50**	4.53	-14.0	-0.5	4.00	**3.48**	3.46	-13.2	+0.3
LU	6.28	**6.34**	6.05	+0.9	+4.8	-	**-**	-	-	-
LV	5.03	**3.83**	3.90	-23.8	-1.6	3.83	**2.92**	2.93	-23.8	-0.3
MT	-	**-**	-	-	-	-	**-**	-	-	-
NL	9.04	**9.21**	8.88	+1.9	+3.7	6.43	**6.66**	6.66	+3.6	-0.1
PL	4.57	**4.27**	4.44	-6.7	-3.8	3.53	**3.52**	3.62	-0.1	-2.7
PT	2.16	**2.05**	1.62	-5.2	+26.2	2.32	**2.26**	1.76	-2.7	+27.9
RO	3.82	**3.92**	3.43	+2.6	+14.0	3.45	**3.77**	3.16	+9.2	+19.5
SE	7.22	**6.83**	6.34	-5.4	+7.7	5.25	**4.90**	4.80	-6.5	+2.1
SI	5.11	**5.08**	5.08	-0.5	+0.1	4.63	**4.54**	4.56	-2.0	-0.3
SK	5.53	**4.31**	4.68	-22.2	-8.0	4.82	**3.97**	4.10	-17.6	-3.2
UK	8.83	**8.11**	7.86	-8.1	+3.2	6.61	**6.24**	6.11	-5.6	+2.1

Country	SOFT WHEAT t/ha					DURUM WHEAT t/ha				
	2015	2016	Avg 5yrs	%16/15	%16/5yrs	2015	2016	Avg 5yrs	%16/15	%16/5yrs
EU-28	6.27	**6.11**	5.83	-2.6	+4.8	3.49	**3.45**	3.33	-1.0	+3.8
AT	5.66	**5.45**	5.42	-3.7	+0.6	4.45	**4.61**	4.49	+3.4	+2.6
BE	9.42	**8.94**	8.84	-5.1	+1.1	-	**-**	-	-	-
BG	4.54	**4.66**	4.12	+2.6	+13.2	-	**-**	-	-	-
CY	-	**-**	-	-	-	2.91	**2.16**	2.26	-25.8	-4.6
CZ	6.36	**6.02**	5.71	-5.3	+5.4	-	**-**	-	-	-
DE	8.11	**8.13**	7.83	+0.3	+3.9	4.64	**5.35**	5.23	+15.1	+2.2
DK	7.93	**7.72**	7.34	-2.6	+5.2	-	**-**	-	-	-
EE	4.79	**3.78**	3.82	-21.0	-1.0	-	**-**	-	-	-
ES	2.99	**3.61**	3.24	+21.0	+11.6	2.59	**2.69**	2.18	+3.7	+23.2
FI	4.10	**3.85**	3.82	-6.1	+0.7	-	**-**	-	-	-
FR	7.92	**7.64**	7.34	-3.6	+4.1	5.62	**5.34**	5.25	-4.9	+1.8
GR	3.30	**2.98**	3.21	-9.5	-7.0	2.88	**2.81**	2.90	-2.4	-3.2
HR	5.39	**5.01**	4.96	-7.1	+1.0	-	**-**	-	-	-
HU	5.14	**5.25**	4.49	+2.0	+16.8	4.83	**5.04**	4.39	+4.2	+14.7
IE	10.66	**10.14**	9.23	-4.9	+9.9	-	**-**	-	-	-
IT	5.41	**5.58**	5.43	+3.1	+2.7	3.31	**3.30**	3.18	-0.4	+3.6
LT	5.24	**4.50**	4.53	-14.0	-0.5	-	**-**	-	-	-
LU	6.28	**6.34**	6.05	+0.9	+4.8	-	**-**	-	-	-
LV	5.03	**3.83**	3.90	-23.8	-1.6	-	**-**	-	-	-
MT	-	**-**	-	-	-	-	**-**	-	-	-
NL	9.04	**9.21**	8.88	+1.9	+3.7	-	**-**	-	-	-
PL	4.57	**4.27**	4.44	-6.7	-3.8	-	**-**	-	-	-
PT	2.16	**2.05**	1.62	-5.2	+26.2	-	**-**	-	-	-
RO	3.82	**3.92**	3.43	+2.6	+14.0	-	**-**	-	-	-
SE	7.22	**6.83**	6.34	-5.4	+7.7	-	**-**	-	-	-
SI	5.11	**5.08**	5.08	-0.5	+0.1	-	**-**	-	-	-
SK	5.56	**4.30**	4.70	-22.6	-8.4	5.14	**4.39**	4.25	-14.5	+3.3
UK	8.83	**8.11**	7.86	-8.1	+3.2	-	**-**	-	-	-

Country	SPRING BARLEY t/ha					WINTER BARLEY t/ha				
	2015	2016	Avg 5yrs	%16/15	%16/5yrs	2015	2016	Avg 5yrs	%16/15	%16/5yrs
EU-28	4.17	**4.24**	4.13	+1.7	+2.8	6.13	**5.98**	5.58	-2.4	+7.3
AT	4.92	**4.12**	4.66	-16.4	-11.7	5.99	**5.99**	5.99	-0.0	-0.1
BE	-	-	-	-	-	9.32	**9.20**	8.63	-1.4	+6.6
BG	-	-	-	-	-	4.04	**4.14**	3.86	+2.3	+7.1
CY	-	-	-	-	-	2.49	**1.59**	1.82	-36.3	-12.8
CZ	5.43	**4.93**	4.96	-9.3	-0.6	5.46	**5.26**	4.87	-3.8	+8.0
DE	5.42	**5.46**	5.70	+0.8	-4.1	7.69	**7.33**	6.92	-4.6	+5.9
DK	5.97	**5.67**	5.67	-5.1	-0.0	6.76	**6.50**	6.31	-3.7	+3.2
EE	4.23	**3.36**	3.38	-20.6	-0.7	-	-	-	-	-
ES	2.51	**3.21**	2.79	+27.8	+15.1	2.11	**3.02**	2.40	+43.1	+25.8
FI	3.46	**3.54**	3.54	+2.1	-0.0	-	-	-	-	-
FR	6.50	**6.29**	5.97	-3.3	+5.3	7.30	**6.99**	6.69	-4.2	+4.6
GR	-	-	-	-	-	2.60	**2.68**	2.81	+2.8	-4.6
HR	-	-	-	-	-	4.39	**4.73**	4.36	+7.8	+8.6
HU	3.89	**4.39**	3.68	+12.9	+19.2	5.14	**5.17**	4.49	+0.6	+15.3
IE	7.72	**7.28**	7.29	-5.8	-0.2	10.21	**9.54**	9.31	-6.5	+2.5
IT	-	-	-	-	-	3.91	**3.76**	3.72	-3.9	+1.2
LT	4.00	**3.48**	3.46	-13.2	+0.3	-	-	-	-	-
LU	-	-	-	-	-	-	-	-	-	-
LV	3.83	**2.92**	2.93	-23.8	-0.3	-	-	-	-	-
MT	-	-	-	-	-	-	-	-	-	-
NL	6.43	**6.66**	6.66	+3.6	-0.1	-	-	-	-	-
PL	3.30	**3.40**	3.49	+3.1	-2.6	4.13	**3.94**	4.10	-4.4	-3.9
PT	-	-	-	-	-	2.32	**2.26**	1.76	-2.7	+27.9
RO	2.38	**2.69**	2.50	+12.9	+7.5	3.90	**4.16**	3.42	+6.7	+21.6
SE	5.20	**4.83**	4.76	-7.1	+1.4	6.18	**6.28**	5.86	+1.6	+7.2
SI	-	-	-	-	-	4.63	**4.54**	4.56	-2.0	-0.3
SK	4.74	**3.95**	4.04	-16.7	-2.3	5.08	**4.04**	4.41	-20.4	-8.4
UK	6.00	**5.81**	5.70	-3.1	+1.9	7.52	**6.87**	6.83	-8.7	+0.5

Country	GRAIN MAIZE t/ha					RYE t/ha				
	2015	2016	Avg 5yrs	%16/15	%16/5yrs	2015	2016	Avg 5yrs	%16/15	%16/5yrs
EU-28	6.31	**7.31**	6.91	+15.9	+5.8	4.00	**3.85**	3.76	-3.7	+2.6
AT	8.64	**10.25**	9.97	+18.6	+2.8	4.15	**4.36**	4.37	+5.2	-0.2
BE	11.91	**11.02**	10.97	-7.5	+0.5	-	-	-	-	-
BG	5.41	**6.89**	5.62	+27.5	+22.8	-	-	-	-	-
CY	-	-	-	-	-	-	-	-	-	-
CZ	5.54	**7.72**	7.64	+39.4	+1.0	4.91	**5.29**	4.84	+7.8	+9.3
DE	8.72	**10.06**	9.95	+15.3	+1.1	5.66	**5.59**	5.50	-1.3	+1.7
DK	6.38	**6.10**	6.05	-4.3	+0.8	6.32	**6.32**	6.08	-0.0	+3.9
EE	-	-	-	-	-	3.83	**3.18**	3.00	-16.9	+6.0
ES	11.30	**11.27**	11.08	-0.3	+1.6	1.91	**2.22**	1.99	+16.3	+11.3
FI	-	-	-	-	-	3.44	**3.22**	3.03	-6.5	+6.2
FR	8.36	**9.27**	9.11	+10.9	+1.7	4.71	**5.07**	4.84	+7.7	+4.9
GR	11.12	**11.00**	11.34	-1.1	-3.0	2.04	**1.97**	2.03	-3.4	-2.7
HR	6.49	**6.59**	6.01	+1.5	+9.6	-	-	-	-	-
HU	5.69	**7.03**	5.77	+23.5	+21.7	2.79	**2.86**	2.66	+2.7	+7.8
IE	-	-	-	-	-	-	-	-	-	-
IT	9.72	**9.53**	9.28	-2.0	+2.7	-	-	-	-	-
LT	4.81	**6.37**	6.38	+32.4	-0.2	2.78	**2.42**	2.37	-12.9	+2.3
LU	-	-	-	-	-	-	-	-	-	-
LV	-	-	-	-	-	4.28	**3.34**	3.22	-21.8	+3.9
MT	-	-	-	-	-	-	-	-	-	-
NL	10.82	**11.60**	10.79	+7.2	+7.5	-	-	-	-	-
PL	4.71	**6.22**	6.15	+32.0	+1.0	2.78	**2.83**	2.82	+2.0	+0.3
PT	8.39	**8.42**	8.29	+0.4	+1.6	0.84	**0.95**	0.86	+12.8	+10.9
RO	3.19	**4.23**	3.73	+32.5	+13.3	-	-	-	-	-
SE	-	-	-	-	-	6.35	**6.16**	6.02	-3.1	+2.2
SI	8.96	**8.20**	7.85	-8.4	+4.4	-	-	-	-	-
SK	4.84	**6.08**	6.04	+25.6	+0.6	3.63	**3.21**	3.60	-11.6	-10.8
UK	-	-	-	-	-	-	-	-	-	-

Country	TRITICALE t/ha					RAPE AND TURNIP RAPE t/ha				
	2015	2016	Avg 5yrs	%16/15	%16/5yrs	2015	2016	Avg 5yrs	%16/15	%16/5yrs
EU-28	4.15	**4.26**	4.20	+2.7	+1.4	3.37	**3.29**	3.21	-2.5	+2.6
AT	5.19	**5.32**	5.24	+2.5	+1.6	2.98	**3.03**	3.23	+1.7	-6.2
BE	-	**-**	-	-	-	4.60	**4.59**	4.43	-0.1	+3.6
BG	2.95	**3.36**	2.93	+13.6	+14.5	2.55	**2.91**	2.46	+14.2	+18.4
CY	-	**-**	-	-	-	-	**-**	-	-	-
CZ	4.72	**4.61**	4.64	-2.4	-0.6	3.43	**3.41**	3.28	-0.5	+4.0
DE	6.47	**6.42**	6.33	-0.8	+1.4	3.90	**4.15**	3.80	+6.2	+9.2
DK	5.31	**5.58**	5.44	+5.0	+2.5	4.25	**3.99**	3.93	-6.1	+1.5
EE	-	**-**	-	-	-	2.51	**1.93**	1.98	-23.0	-2.7
ES	2.08	**2.65**	2.22	+27.3	+19.3	2.03	**2.71**	2.20	+33.1	+23.2
FI	-	**-**	-	-	-	1.54	**1.47**	1.46	-4.7	+0.5
FR	5.41	**5.41**	5.30	+0.0	+2.1	3.56	**3.41**	3.43	-4.3	-0.7
GR	-	**-**	-	-	-	-	**-**	-	-	-
HR	3.82	**3.77**	3.93	-1.3	-4.0	2.59	**2.73**	2.78	+5.2	-1.9
HU	3.99	**4.30**	3.75	+7.8	+14.8	2.45	**3.00**	2.62	+22.4	+14.5
IE	-	**-**	-	-	-	-	**-**	-	-	-
IT	-	**-**	-	-	-	2.60	**2.54**	2.37	-2.0	+7.2
LT	3.84	**3.39**	3.31	-11.8	+2.3	3.08	**2.30**	2.25	-25.1	+2.6
LU	-	**-**	-	-	-	-	**-**	-	-	-
LV	-	**-**	-	-	-	2.89	**2.29**	2.24	-20.7	+2.5
MT	-	**-**	-	-	-	-	**-**	-	-	-
NL	-	**-**	-	-	-	-	**-**	-	-	-
PL	3.52	**3.56**	3.58	+1.0	-0.6	3.26	**2.85**	2.88	-12.6	-1.0
PT	1.72	**1.66**	1.39	-3.2	+19.4	-	**-**	-	-	-
RO	3.48	**3.71**	3.38	+6.6	+9.8	2.36	**2.73**	2.28	+15.5	+19.6
SE	5.80	**5.79**	5.49	-0.2	+5.4	3.80	**3.45**	3.06	-9.1	+12.9
SI	-	**-**	-	-	-	-	**-**	-	-	-
SK	3.60	**3.46**	3.47	-4.1	-0.4	2.66	**2.42**	2.64	-9.2	-8.3
UK	5.74	**4.09**	4.26	-28.8	-4.1	3.56	**3.57**	3.49	+0.5	+2.3

Country	SUGAR BEETS t/ha					POTATO t/ha				
	2015	2016	Avg 5yrs	%16/15	%16/5yrs	2015	2016	Avg 5yrs	%16/15	%16/5yrs
EU-28	71.65	**73.39**	71.79	+2.4	+2.2	32.03	**33.21**	32.09	+3.7	+3.5
AT	62.80	**68.53**	70.59	+9.1	-2.9	26.34	**31.68**	31.37	+20.3	+1.0
BE	85.08	**79.92**	77.81	-6.1	+2.7	46.58	**47.47**	47.82	+1.9	-0.7
BG	-	**-**	-	-	-	14.95	**14.67**	13.51	-1.8	+8.6
CY	-	**-**	-	-	-	-	**-**	-	-	-
CZ	59.38	**66.40**	64.00	+11.8	+3.7	22.26	**25.92**	26.72	+16.4	-3.0
DE	72.17	**71.77**	71.85	-0.6	-0.1	43.81	**45.36**	44.29	+3.5	+2.4
DK	61.24	**62.81**	63.01	+2.6	-0.3	40.44	**40.91**	40.64	+1.2	+0.7
EE	-	**-**	-	-	-	-	**-**	-	-	-
ES	95.30	**95.64**	89.32	+0.4	+7.1	31.14	**32.00**	30.59	+2.8	+4.6
FI	32.74	**36.56**	36.65	+11.7	-0.2	24.31	**26.32**	26.30	+8.3	+0.1
FR	87.50	**89.74**	89.15	+2.6	+0.7	42.50	**44.73**	44.23	+5.2	+1.1
GR	-	**-**	-	-	-	25.24	**25.77**	25.50	+2.1	+1.1
HR	54.49	**56.36**	52.45	+3.4	+7.5	17.06	**16.15**	16.81	-5.4	-3.9
HU	57.66	**63.18**	53.96	+9.6	+17.1	22.65	**26.76**	24.19	+18.2	+10.6
IE	-	**-**	-	-	-	-	**-**	-	-	-
IT	57.01	**56.76**	55.93	-0.4	+1.5	27.55	**26.68**	26.09	-3.1	+2.3
LT	50.61	**51.65**	51.70	+2.1	-0.1	17.00	**16.38**	16.23	-3.7	+0.9
LU	-	**-**	-	-	-	-	**-**	-	-	-
LV	-	**-**	-	-	-	18.00	**18.00**	17.97	+0.0	+0.2
MT	-	**-**	-	-	-	-	**-**	-	-	-
NL	83.30	**84.31**	81.21	+1.2	+3.8	42.69	**44.84**	44.08	+5.0	+1.7
PL	52.00	**55.16**	52.79	+6.1	+4.5	21.70	**22.01**	22.26	+1.4	-1.1
PT	-	**-**	-	-	-	18.62	**18.99**	17.85	+2.0	+6.4
RO	39.40	**41.89**	36.66	+6.3	+14.3	14.37	**15.26**	15.10	+6.2	+1.1
SE	60.80	**63.45**	63.46	+4.4	-0.0	34.65	**34.41**	33.41	-0.7	+3.0
SI	-	**-**	-	-	-	-	**-**	-	-	-
SK	56.01	**53.27**	55.28	-4.9	-3.6	-	**-**	-	-	-
UK	66.50	**71.03**	70.19	+6.8	+1.2	40.20	**41.69**	39.91	+3.7	+4.5

Country	SUNFLOWER t/ha				
	2015	2016	Avg 5yrs	%16/15	%16/5yrs
EU-28	1.74	**2.01**	1.91	+15.6	+5.0
AT	2.00	**2.61**	2.47	+30.5	+5.6
BE	-	**-**	-	-	-
BG	2.02	**2.46**	2.10	+21.9	+17.0
CY	-	**-**	-	-	-
CZ	2.05	**2.33**	2.29	+13.8	+1.8
DE	1.92	**2.14**	2.14	+11.5	-0.2
DK	-	**-**	-	-	-
EE	-	**-**	-	-	-
ES	0.94	**1.09**	1.07	+16.1	+1.5
FI	-	**-**	-	-	-
FR	1.96	**2.27**	2.25	+15.8	+0.7
GR	2.74	**2.55**	2.52	-6.8	+1.1
HR	2.66	**2.62**	2.53	-1.4	+3.7
HU	2.45	**2.55**	2.41	+4.1	+5.5
IE	-	**-**	-	-	-
IT	2.26	**2.24**	2.25	-1.0	-0.2
LT	-	**-**	-	-	-
LU	-	**-**	-	-	-
LV	-	**-**	-	-	-
MT	-	**-**	-	-	-
NL	-	**-**	-	-	-
PL	-	**-**	-	-	-
PT	1.10	**0.82**	0.76	-25.1	+8.1
RO	1.35	**1.79**	1.74	+32.2	+3.0
SE	-	**-**	-	-	-
SI	-	**-**	-	-	-
SK	2.30	**2.39**	2.33	+4.0	+2.6
UK	-	**-**	-	-	-

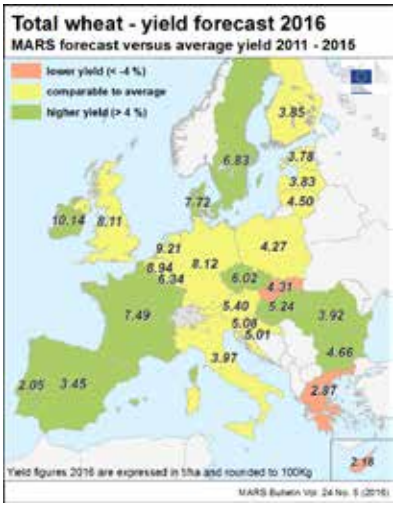
Note: Yields are forecast for crops with more than 10 000 ha per country.
Sources: 2011-2016 data come from DG AGRICULTURE short term Outlook data (cated April 2016, received on 04/05/2016) EUROSTAT Eurobase (last update: 03/05/2016) and EES (last update: 15/10/2015).
2016 yields come from MARS Crop Yield Forecasting System (output up to 20/05/2016).

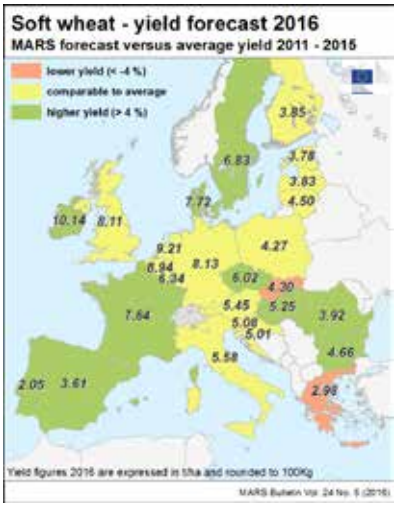
Country	WHEAT (t/ha)				
	2015	2016	Avg 5yrs	%16/15	%16/5yrs
BY	3.43	**3.78**	3.47	+10.2	+8.9
DZ	1.48	**1.31**	1.60	-11.8	-18.5
MA	2.36	**0.61**	1.86	-74.2	-67.2
TN	2.15	**1.94**	2.05	-9.8	-5.3
TR	2.90	**2.66**	2.69	-8.2	-1.0
UA	3.99	**3.68**	3.54	-7.8	+4.0

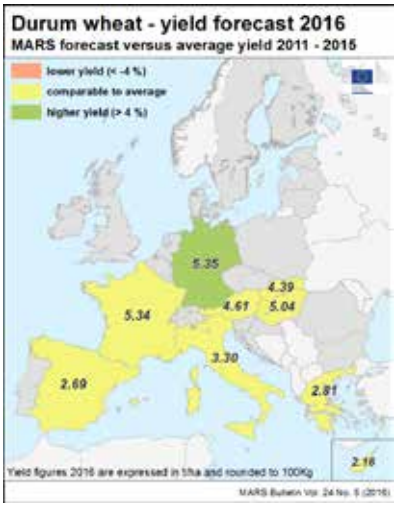
Country	BARLEY (t/ha)				
	2015	2016	Avg 5yrs	%16/15	%16/5yrs
BY	3.33	**3.49**	3.24	+4.9	+7.7
DZ	1.18	**1.22**	1.39	+3.7	-11.9
MA	1.62	**0.44**	1.16	-72.8	-62.2
TN	1.44	**1.17**	1.30	-18.7	-10.1
TR	2.9	**2.54**	2.65	-12.4	-4.2
UA	3.07	**2.71**	2.59	-11.8	+4.7

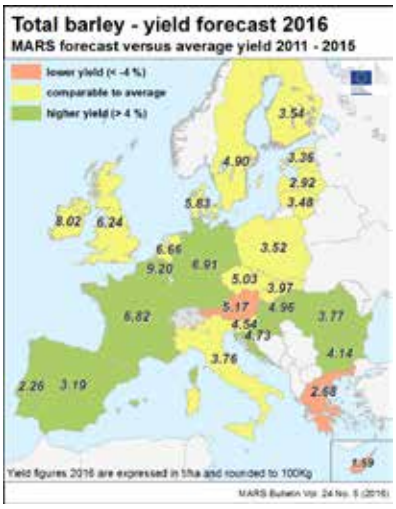
Country	GRAIN MAIZE (t/ha)				
	2015	2016	Avg 5yrs	%16/15	%16/5yrs
BY	5.33	**5.46**	5.60	+2.4	-2.6
DZ	-	**-**	-	-	-
MA	-	**-**	-	-	-
TN	-	**-**	-	-	-
TR	9.30	**9.19**	8.39	-1.2	+9.5
UA	5.56	**5.99**	5.74	+7.6	+4.2

Note: Yields are forecast for crops with more than 10 000 ha per country.
Sources: 2011-2015 data come from USDA, State Statistics Service of Ukraine, FAO, Turkish Statistical Office, PSD-online, INRA Maroc, Min AGRI Tunisia and DSASI Algeria.
2016 yields come from MARS Crop Yield Forecasting System (output up to 20/05/2016)

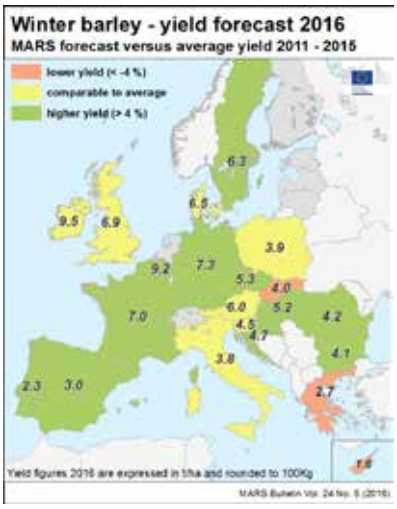

Total wheat - yield forecast 2016
MARS forecast versus average yield 2011 - 2015
lower yield (< -4 %)
comparable to average
higher yield (> 4 %)
Yield figures 2016 are expressed in t/ha and rounded to 100Kg

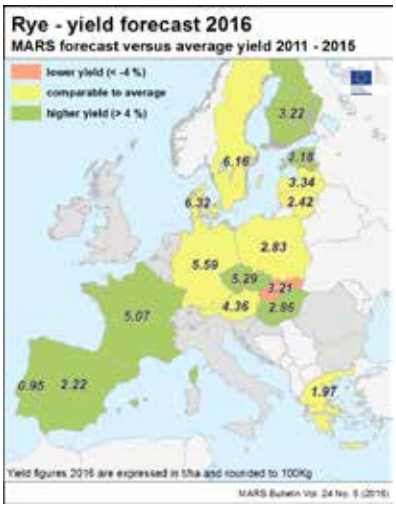

Soft wheat - yield forecast 2016
MARS forecast versus average yield 2011 - 2015
lower yield (< -4 %)
comparable to average
higher yield (> 4 %)
Yield figures 2016 are expressed in t/ha and rounded to 100Kg

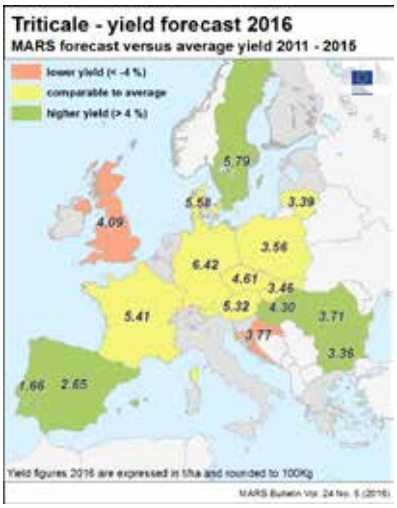

Durum wheat - yield forecast 2016
MARS forecast versus average yield 2011 - 2015
lower yield (< -4 %)
comparable to average
higher yield (> 4 %)
Yield figures 2016 are expressed in t/ha and rounded to 100Kg


Total barley - yield forecast 2016
MARS forecast versus average yield 2011 - 2015
lower yield (< -4 %)
comparable to average
higher yield (> 4 %)
Yield figures 2016 are expressed in t/ha and rounded to 100Kg


Spring barley - yield forecast 2016
MARS forecast versus average yield 2011 - 2015
lower yield (< -4 %)
comparable to average
higher yield (> 4 %)
Yield figures 2016 are expressed in t/ha and rounded to 100Kg


Winter barley - yield forecast 2016
MARS forecast versus average yield 2011 - 2015
lower yield (< -4 %)
comparable to average
higher yield (> 4 %)
Yield figures 2016 are expressed in t/ha and rounded to 100Kg


Rye - yield forecast 2016
MARS forecast versus average yield 2011 - 2015
lower yield (< -4 %)
comparable to average
higher yield (> 4 %)
Yield figures 2016 are expressed in t/ha and rounded to 100Kg

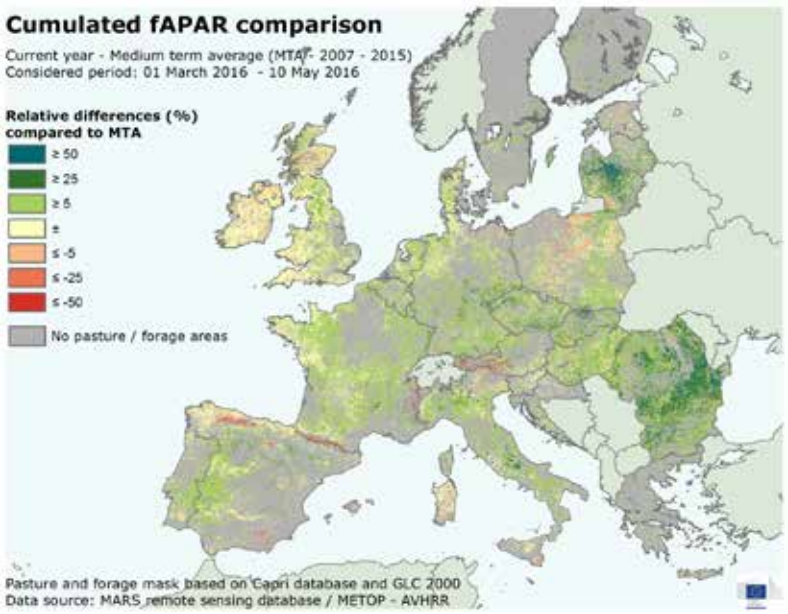

Triticale - yield forecast 2016
MARS forecast versus average yield 2011 - 2015
lower yield (< -4 %)
comparable to average
higher yield (> 4 %)
Yield figures 2016 are expressed in t/ha and rounded to 100Kg


Rapeseed - yield forecast 2016
MARS forecast versus average yield 2011 - 2015
lower yield (< -4 %)
comparable to average
higher yield (> 4 %)
Yield figures 2016 are expressed in t/ha and rounded to 100Kg

5. Pastures in Europe — Regional monitoring

Positive conditions in central and southern Europe

Weather conditions since January have been unusually humid in most of the main European pasture areas. Grassland growth rates since early spring are high, thanks to the high soil moisture levels in central and southern Europe. In northern countries (UK, Ireland, Estonia), by contrast, lower-than-usual temperatures led to a slight delay in pasture development.



Methodological note

The relative index of pasture productivity is a synthetic indicator of biomass formation based on the integration of the fAPAR (fraction of absorbed photosynthetically active radiation) remote sensing product of pasture areas at country level over a period of interest (in this bulletin, from 1 March to 10 May). The spatial aggregation from remote sensing image pixels to a country-level index was made using a pastures mask from the Common Agricultural Policy Regionalised Impact model (CAPRI, http://www.capri-model.org). The index shows the relative position of the current season within the historical series from 2008 to 2015, and its values range approximately from – 3 to 3. A value of 0 indicates that biomass production in the current season is similar to the long-term average. Values higher than 2 and below – 2 indicate that biomass production in the current season is close to, respectively, the historical maximum and minimum of the period 2008-2015.

High biomass production rates in the Iberian Peninsula and Italy

Conditions are highly favourable for grasslands in the *Dehesa* area between **Spain** and **Portugal**. Above-seasonal temperatures in January and February boosted pasture growth since early spring. Moreover, abundant rainfall in April and May will facilitate the maintenance of high biomass formation levels in June. In northern Spain (*Asturias, Cantabria*), colder-than-usual conditions and low incoming radiation levels in February and March led to a sharp decrease in the photosynthetic activity of grasslands. Temperatures rose from mid-April onwards, facilitating the progressive recovery of biomass production rates. Pasture growth is greater than average in most of **Italy**. Higher-than-usual temperatures, especially in February and April, led to the rapid vegetative growth of grasslands. Precipitation was sufficient to support high biomass production, with the exception of *Sicilia* and *Sardegna*, where dry conditions in March and April moderately constrained grasslands growth.

Humid start to the season in north-eastern Europe

The biomass production of grasslands from January to May in **France** and the **Benelux** region has been significantly above the medium-term average, thanks to abundant rainfall events. These favourable conditions are clearly appreciable in southern France (*Auvergne, Limousine, Midi-Pyrenees, Rhône-Alpes*), where above-seasonal temperatures since April led to a rapid increase in the photosynthetic activity of pastures. In the north-west (*Bretagne, Pays de la Loire*), biomass production remains only slightly above seasonal values due to the chilly spring weather conditions. In the **UK** and **Ireland**, weather conditions since January were humid. In both countries, grassland productivity has been constrained by unusually low temperatures during the second halves of February and April. This has especially affected Scotland and Ireland, where the biomass formation of pastures is below average.

Positive conditions in central Europe

Grassland growth in central and southern **Germany** is well above the medium-term average, thanks to mild thermal conditions, especially in February and the first two dekads of April. Soil moisture is especially high in the south (*Bayern, Baden-Wuerttemberg*), as precipitation cumulated since January was substantially higher than in an average year, thus depicting a favourable outlook for biomass production in the coming month. By contrast, in the northernmost regions (*Schleswig-Holstein, Mecklemburg-Vorpommern*), weather conditions in the March-May period were drier than usual. This slightly constrained the growth rate of grasslands, which is currently average.

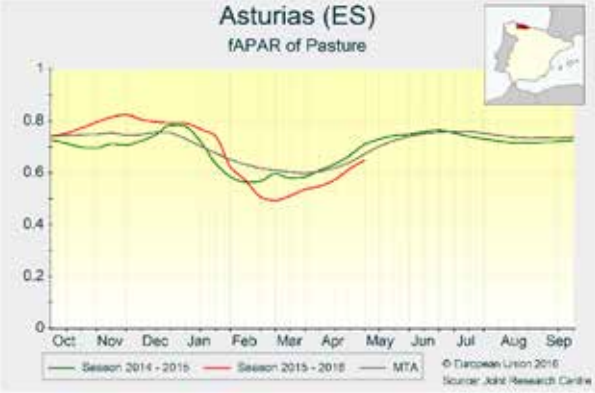
In the **Czech Republic**, **Slovakia** and eastern **Austria**, pasture conditions are similar to those in southern Germany; biomass production levels were above the long-term average during most of the growing season thanks to abundant rainfall and good temperatures. Unusually cold temperatures at the end of April in the Tirol region led to a delay in the initial phase of vegetative growth in grasslands, however, which is reflected as a negative anomaly in the cumulated fAPAR map.

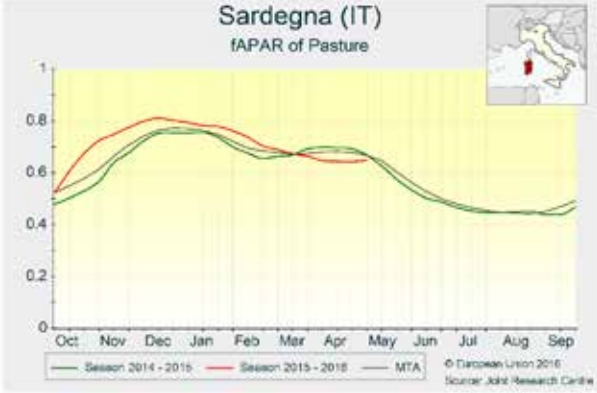
Above-average pasture productivity in the Baltic Sea area

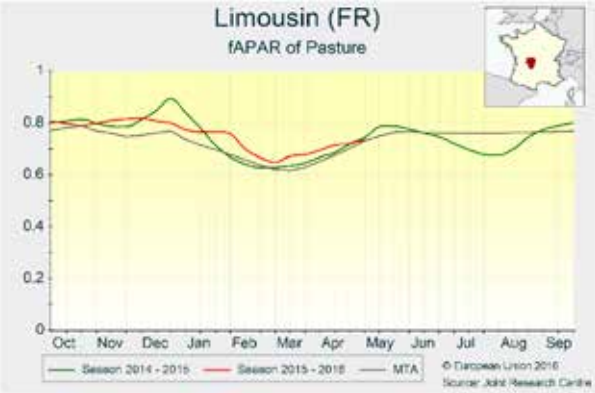
Grassland conditions in **Denmark**, **Latvia**, **Lithuania**, **Finland** and **Sweden** are favourable. Temperatures in February and March were unusually mild, leading to an early start to vegetative growth in the main pasture areas of these countries. Precipitation from January to May was sufficient to support above-average production rates. In the eastern half of **Poland** (*Mazowieckie, Lubelskie*), the vegetative growth of grasslands is also above the medium-term average, thanks to abundant precipitation and exceptionally high temperatures since February. In northern regions (*Pomorskie, Kujwawsko-Pomorskie*), however, weather conditions have been particularly dry since March. Biomass formation in these areas is slightly below the norm. Substantial precipitation in the second half of May is needed to prevent major constraints to grassland growth.

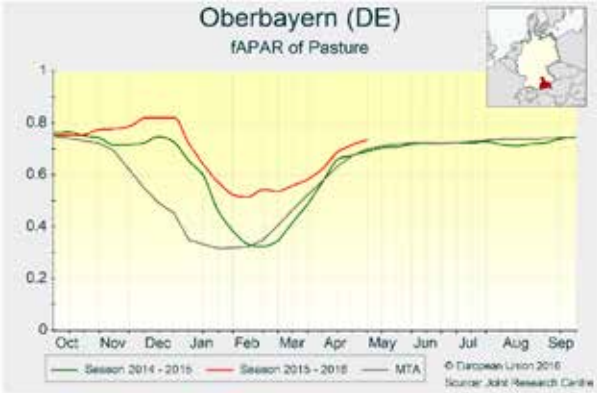
Exceptionally high biomass production in south-eastern Europe

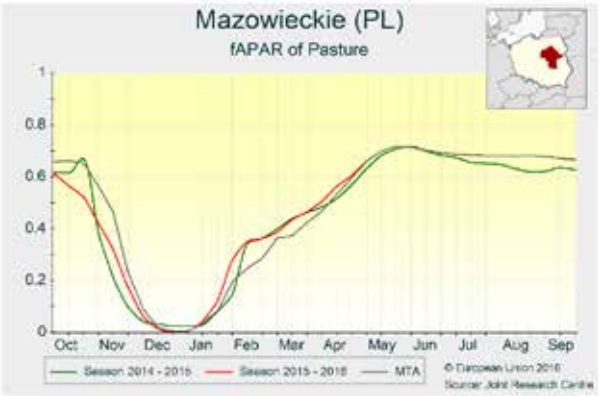
The start of the growing season in **Romania** and **Bulgaria** was extremely positive. Cumulated precipitation from March to mid-May was almost twice that of an average year, and average temperatures in the first two dekads of April was about 5 °C above seasonal values. Grasslands in the Danube Basin between both countries present the highest photosynthetic activity levels of the period 2008-2016. Moreover, abundant rainfall during the first half of May has ensured that high biomass production will continue in the coming weeks Weather conditions were also favourable for pasture growth in **Hungary**. The observed high biomass production levels were mainly determined by the abundant rainfall registered in February (more than 100 mm). The high soil moisture levels reached at the end of February permitted the rapid vegetative growth of grasslands, even though March and April were rather dry and temperatures were above seasonal values. The abundant precipitation registered in the first half of May will help to maintain biomass formation well above the medium-term average in the coming weeks.

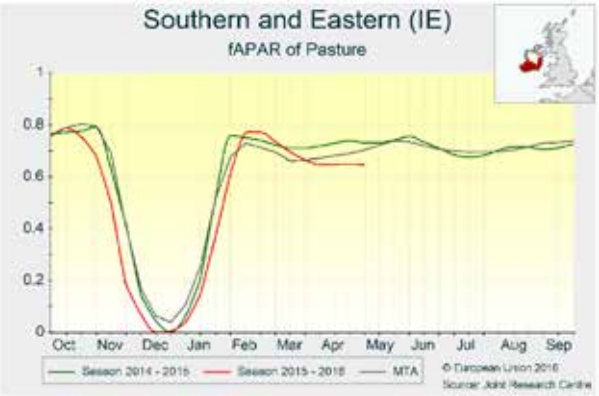


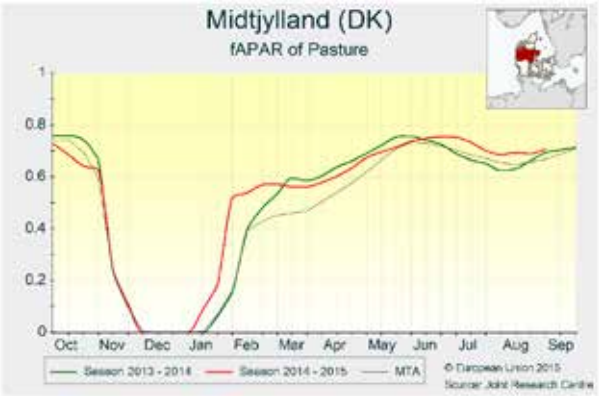


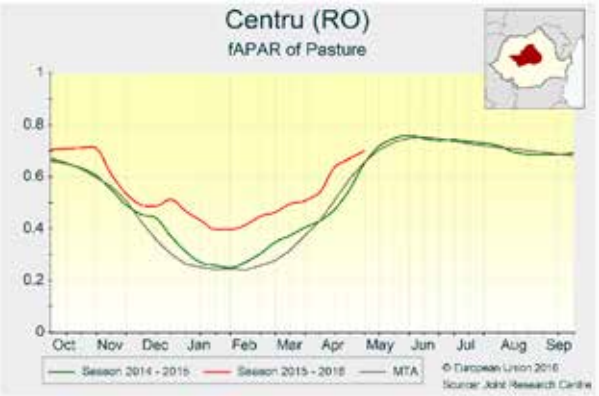





Mazowieckie (PL)
fAPAR of Pasture
1
0.8
0.6
0.4
0.2
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2014 - 2015
Season 2015 - 2016
MTA
© European Union 2016
Source: Joint Research Centre

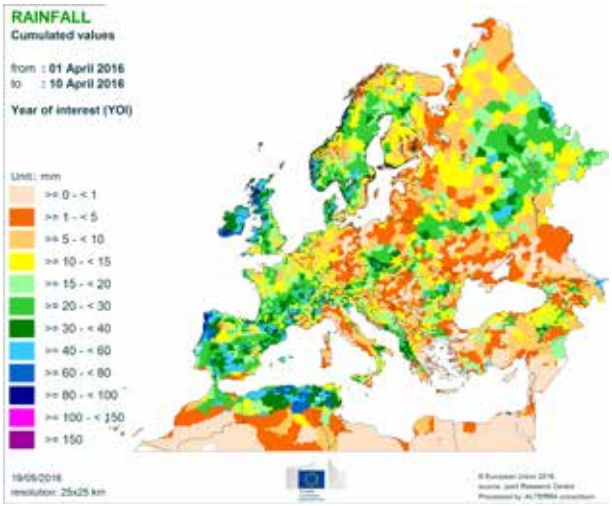

Southern and Eastern (IE)
fAPAR of Pasture
1
0.8
0.6
0.4
0.2
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2014 - 2015
Season 2015 - 2016
MTA
© European Union 2016
Source: Joint Research Centre

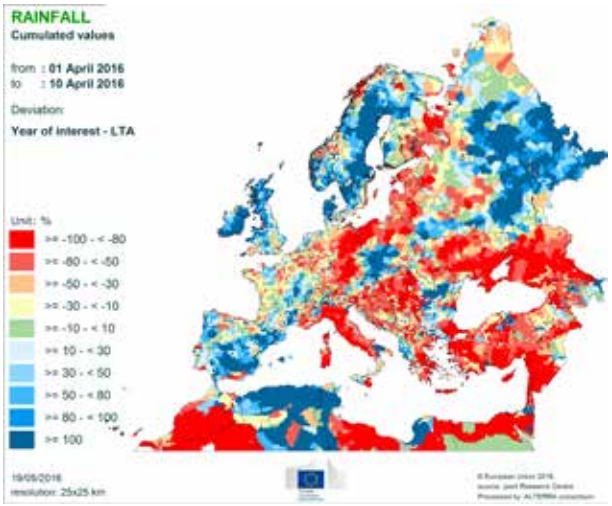

Midtjylland (DK)
fAPAR of Pasture
1
0.8
0.6
0.4
0.2
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2013 - 2014
Season 2014 - 2015
MTA
© European Union 2015
Source: Joint Research Centre

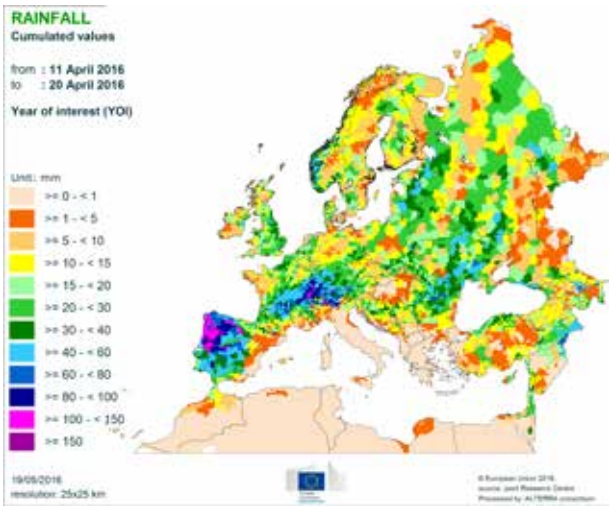

Centru (RO)
fAPAR of Pasture
1
0.8
0.6
0.4
0.2
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2014 - 2015
Season 2015 - 2016
MTA
© European Union 2016
Source: Joint Research Centre

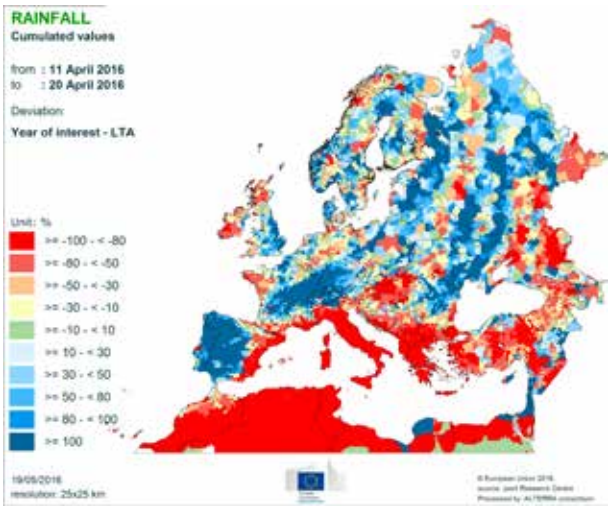
6. Atlas

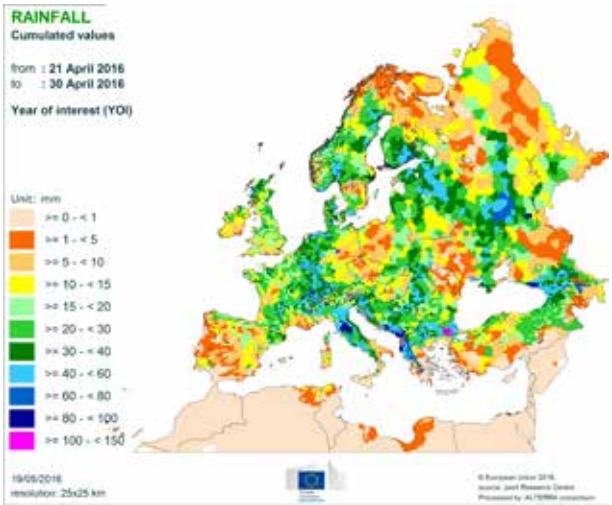
Precipitation

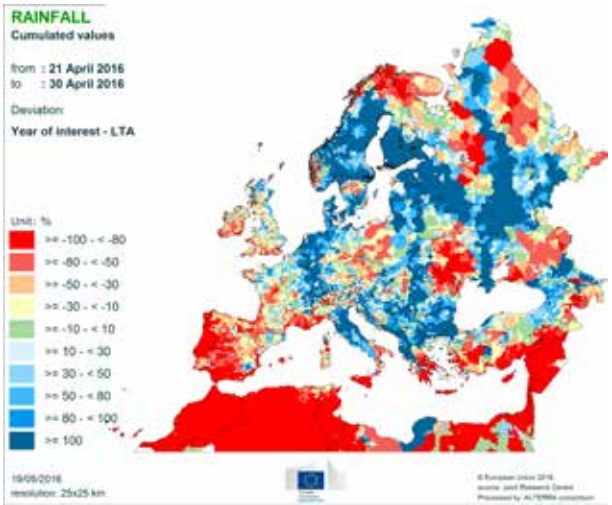


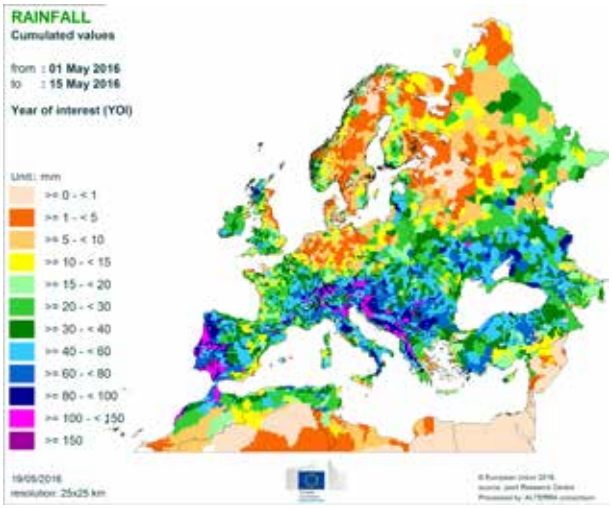


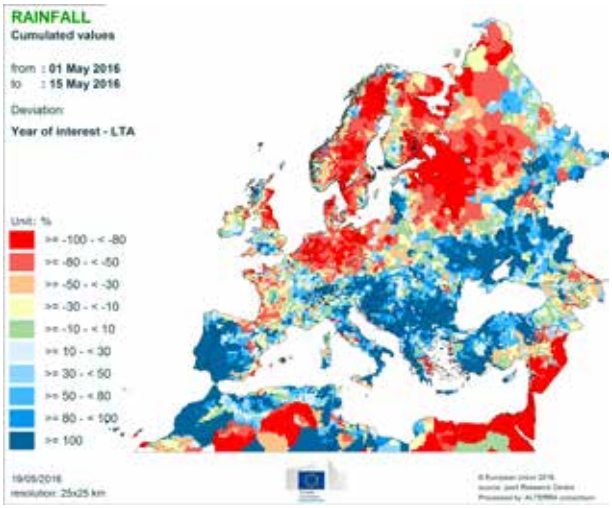


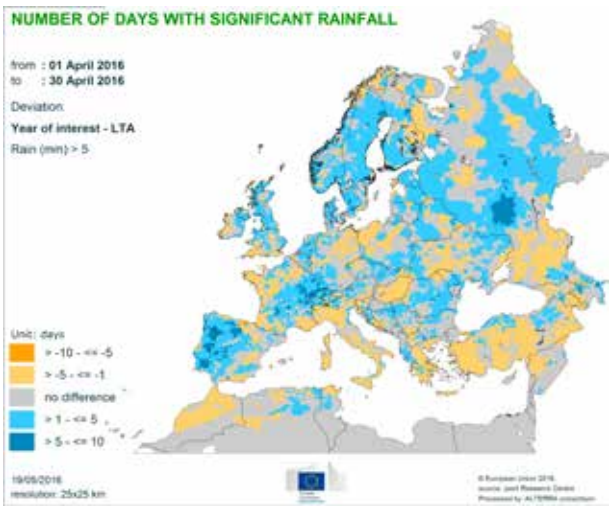


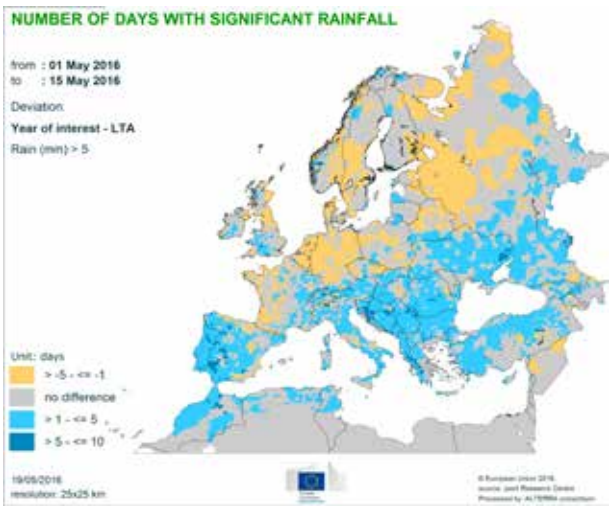




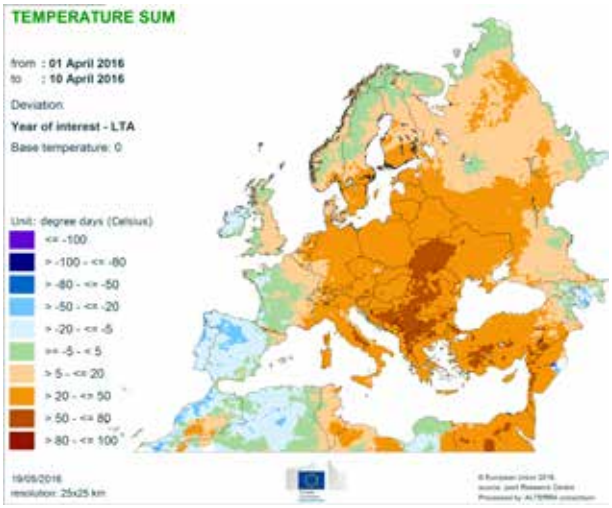


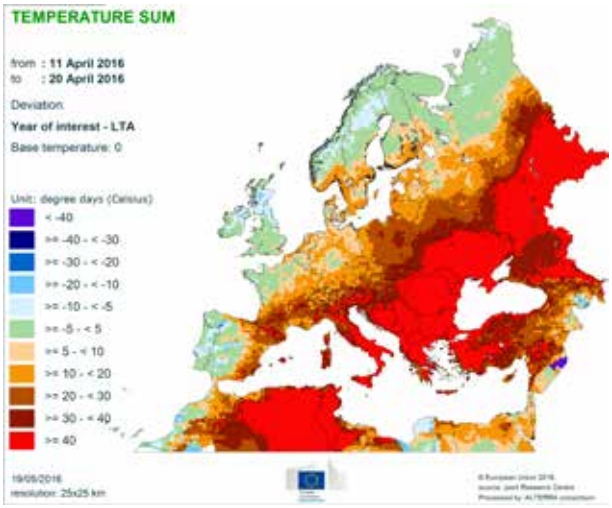


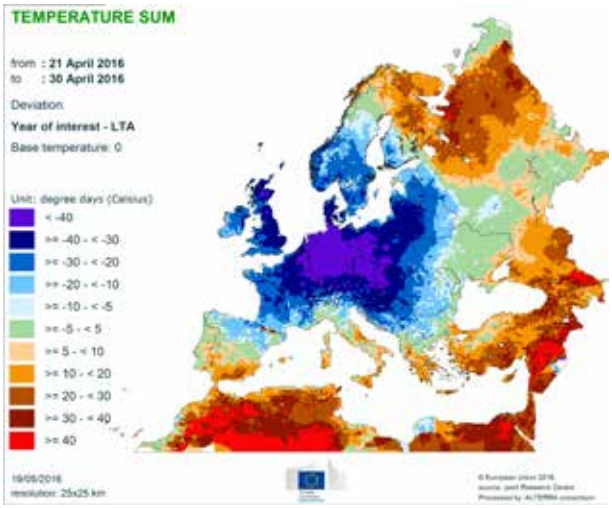


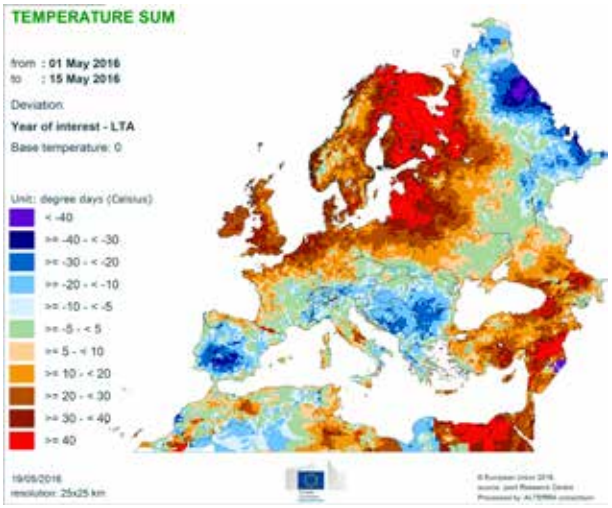


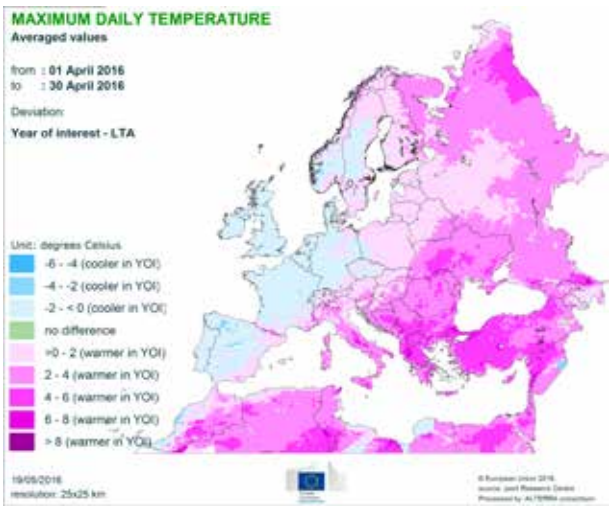
Temperature regime

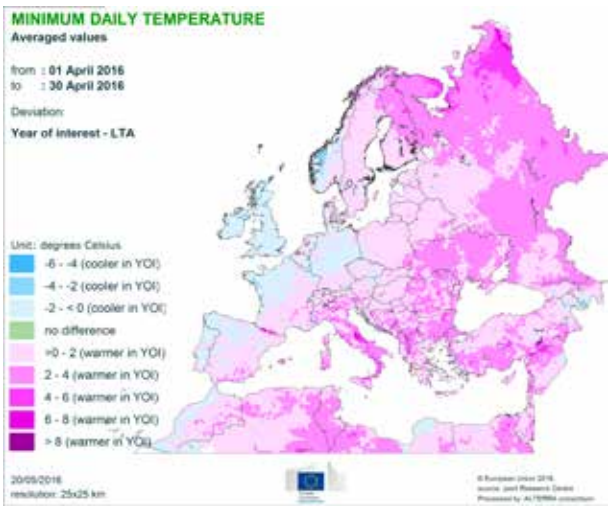


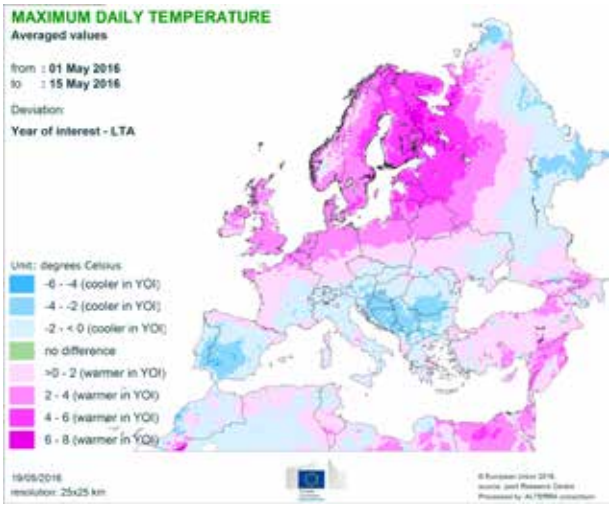



TEMPERATURE SUM
from : 21 April 2016
to : 30 April 2016
Deviation:
Year of interest - LTA
Base temperature: 0
Unit: degree days (Celsius)
< -40
>= -40 - < -30
>= -30 - < -20
>= -20 - < -10
>= -10 - < -5
>= -5 - < 5
>= 5 - < 10
>= 10 - < 20
>= 20 - < 30
>= 30 - < 40
>= 40
19/05/2016
resolution: 25x25 km


TEMPERATURE SUM
from : 01 May 2016
to : 15 May 2016
Deviation:
Year of interest - LTA
Base temperature: 0
Unit: degree days (Celsius)
< -40
>= -40 - < -30
>= -30 - < -20
>= -20 - < -10
>= -10 - < -5
>= -5 - < 5
>= 5 - < 10
>= 10 - < 20
>= 20 - < 30
>= 30 - < 40
>= 40
19/05/2016
resolution: 25x25 km


MAXIMUM DAILY TEMPERATURE
Averaged values
from : 01 April 2016
to : 30 April 2016
Deviation:
Year of interest - LTA
Unit: degrees Celsius
-6 - -4 (cooler in YOI)
-4 - -2 (cooler in YOI)
-2 - < 0 (cooler in YOI)
no difference
>0 - 2 (warmer in YOI)
2 - 4 (warmer in YOI)
4 - 6 (warmer in YOI)
6 - 8 (warmer in YOI)
> 8 (warmer in YOI)
19/05/2016
resolution: 25x25 km


MINIMUM DAILY TEMPERATURE
Averaged values
from : 01 April 2016
to : 30 April 2016
Deviation:
Year of interest - LTA
Unit: degrees Celsius
-6 - -4 (cooler in YOI)
-4 - -2 (cooler in YOI)
-2 - < 0 (cooler in YOI)
no difference
>0 - 2 (warmer in YOI)
2 - 4 (warmer in YOI)
4 - 6 (warmer in YOI)
6 - 8 (warmer in YOI)
> 8 (warmer in YOI)
20/05/2016
resolution: 25x25 km


MAXIMUM DAILY TEMPERATURE
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Unit: degrees Celsius
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no difference
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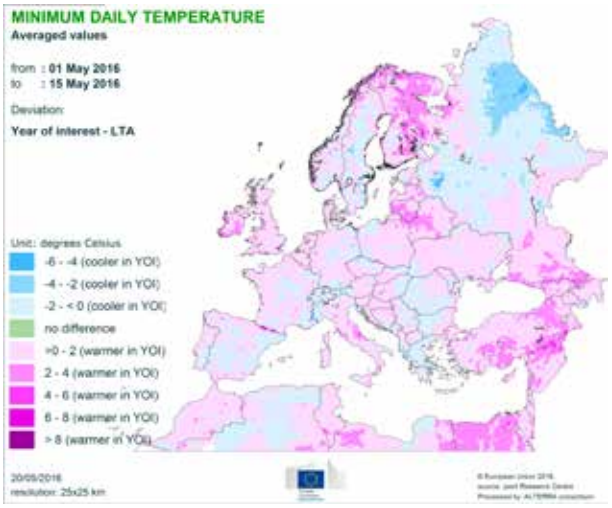
4 - 6 (warmer in YOI)
6 - 8 (warmer in YOI)
19/05/2016
resolution: 25x25 km


MINIMUM DAILY TEMPERATURE
Averaged values
from : 01 May 2016
to : 15 May 2016
Deviation:
Year of interest - LTA
Unit: degrees Celsius
-6 - -4 (cooler in YOI)
-4 - -2 (cooler in YOI)
-2 - < 0 (cooler in YOI)
no difference
>0 - 2 (warmer in YOI)
2 - 4 (warmer in YOI)
4 - 6 (warmer in YOI)
6 - 8 (warmer in YOI)
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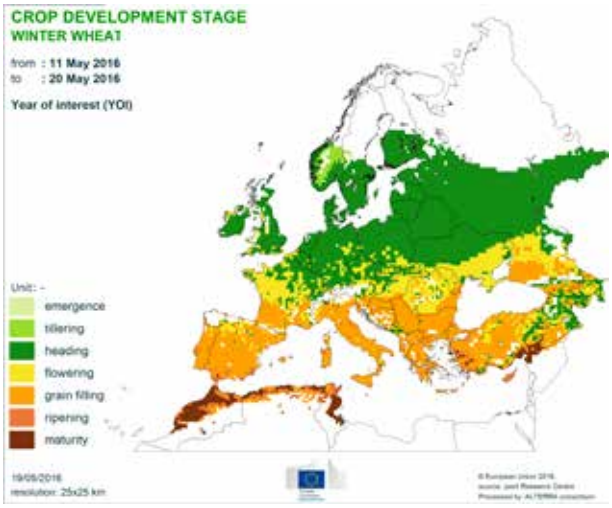
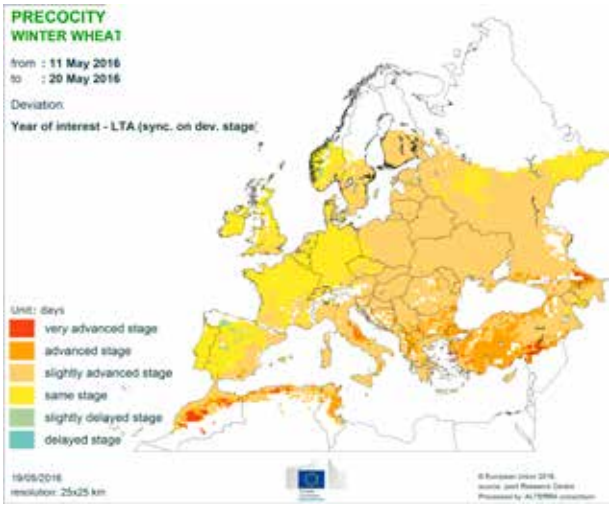
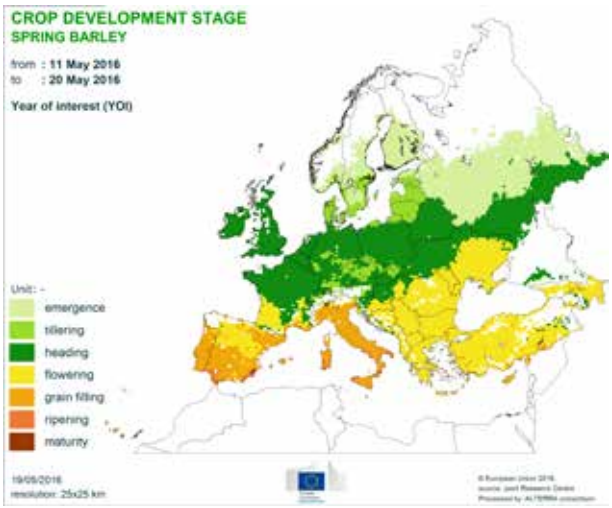
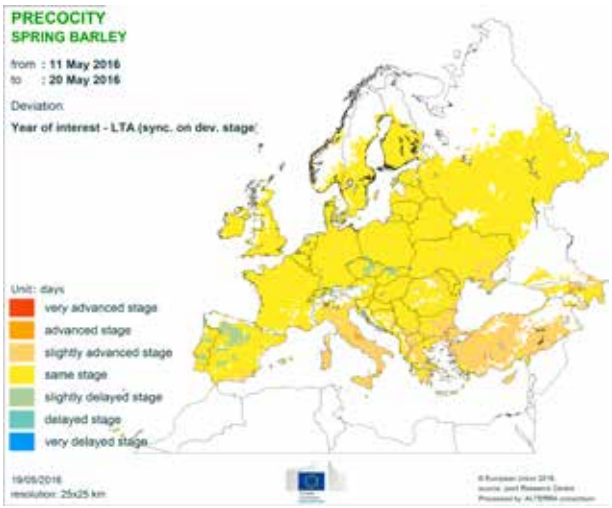
20/05/2016
resolution: 25x25 km

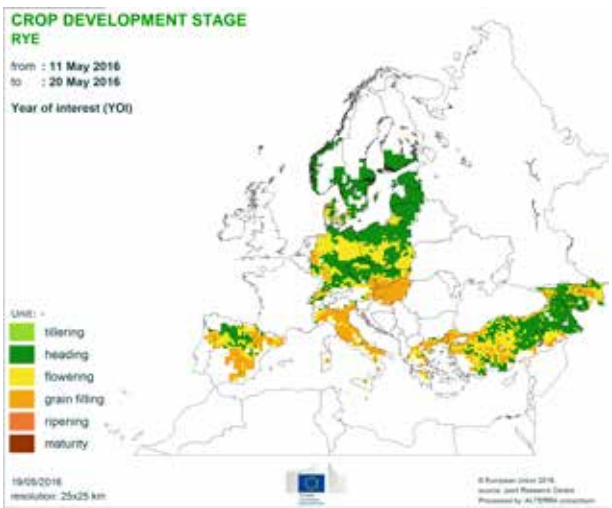
Crop development stages and precocity

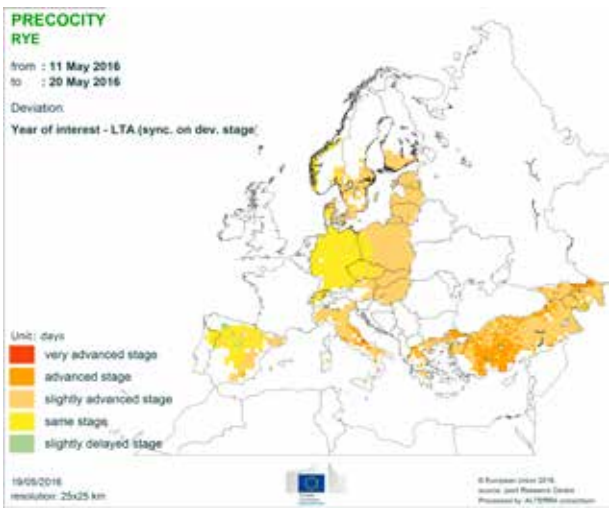




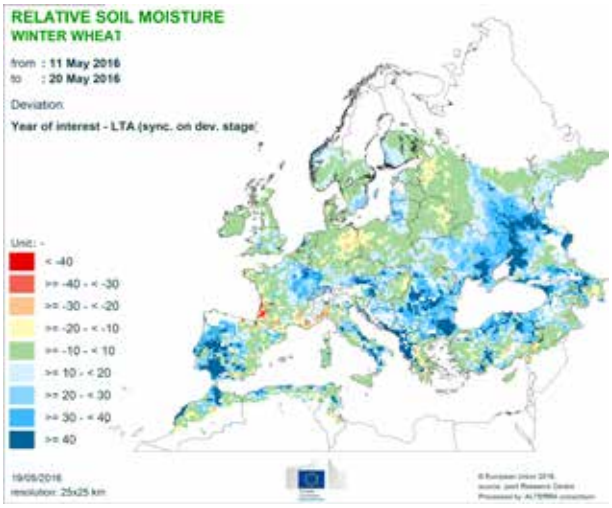


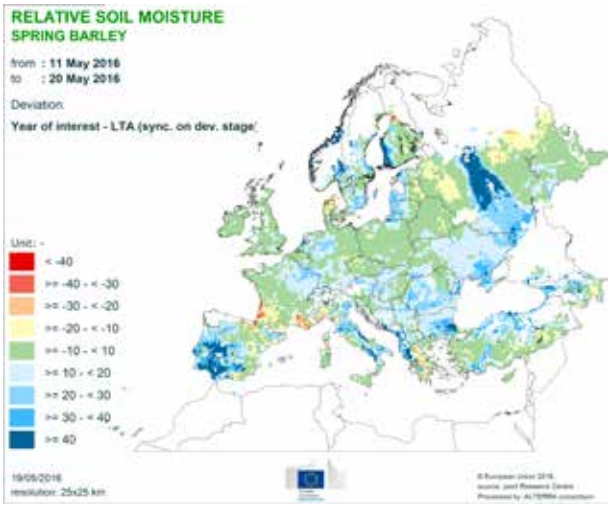


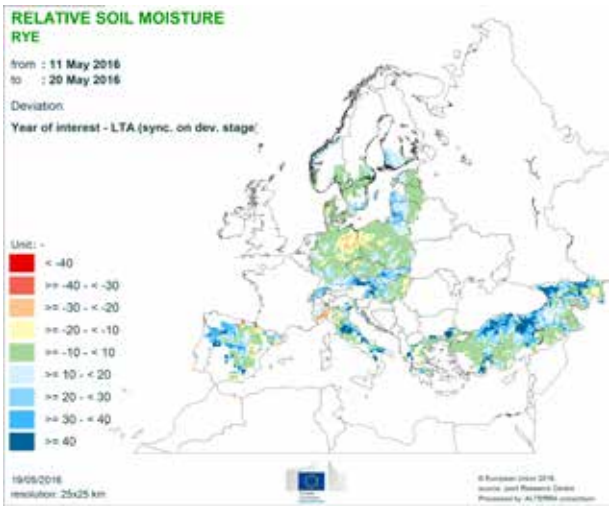


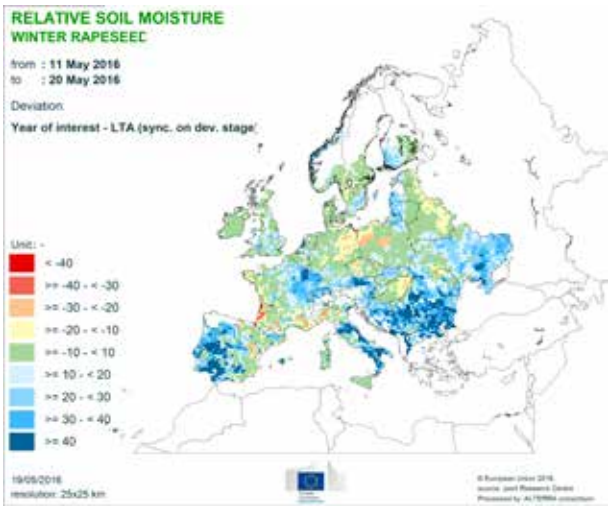


Relative soil moisture









JRC MARS Bulletins 2016

Date	Publication	Reference
25 Jan	Agromet analysis	Vol. 24 No 1
22 Feb	Agromet analysis	Vol. 24 No 2
21 Mar	Agromet analysis and yield forecast	Vol. 24 No 3
26 Apr	Agromet analysis, remote sensing, and yield forecast,	Vol. 24 No 4
23 May	Agromet analysis, remote sensing, yield forecast and pasture analysis and sowing conditions	Vol. 24 No 5
20 Jun	Agromet analysis, remote sensing, yield forecast, pasture update and rice analysis	Vol. 24 No 6
25 Jul	Agromet analysis, remote sensing and yield forecast	Vol. 24 No 7
22 Aug	Agromet analysis, remote sensing, yield forecast and pasture update	Vol. 24 No 8
26 Sep	Agromet analysis, remote sensing, yield forecast and pasture update	Vol. 24 No 9
24 Oct	Agromet analysis, remote sensing, yield forecast and rice analysis	Vol. 24 No 10
21 Nov	Agromet analysis, yield forecast and sowing conditions	Vol. 24 No 11
19 Dec	Agromet analysis	Vol. 24 No 12

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Analysis and reports
B. Baruth, I. Biavetti, A. Bussay, A. Ceglar, G. De Sanctis, S. Garcia Condado, S. Karetsos, R. Lecerf, R. Lopez, L. Nisini, L. Seguini, A. Toreti, M. Van den Berg, M. Van der Velde.

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The long-term average (LTA) used within this Bulletin as a reference is based on an archive of data covering 1975-2015.

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